

Title: Shohini Ghose, Wilfrid Laurier University

Speakers: Shohini Ghose

Collection: Perimeter Public Lectures

Date: March 04, 2020 - 7:00 PM

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Abstract: Youâ€™ve likely heard of quantum computing. Maybe youâ€™re even familiar with the basic principles of how this emerging form of technology harnesses counter-intuitive properties of the subatomic realm to perform tasks that would overwhelm even todayâ€™s most powerful â€œclassicalâ€• computers. But do you know what that will mean for the ways you work, communicate, play, and live?

Does anyone truly know? Well, no, because some very big challenges remain before quantum computers are commonplace. But for expert perspectives on what the future may hold and how to prepare for the quantum future, youâ€™d be hard-pressed to find a better source than Shohini Ghose.

In her March 4 public lecture at Perimeter Institute, Ghose will guide the audience through the latest advances in the quantum world and share her own journey in quantum science. Ghose, a professor of physics and computer science at Wilfrid Laurier University, studies how the laws of quantum physics can be exploited to transform computing and communications, and to achieve feats such as teleportation.

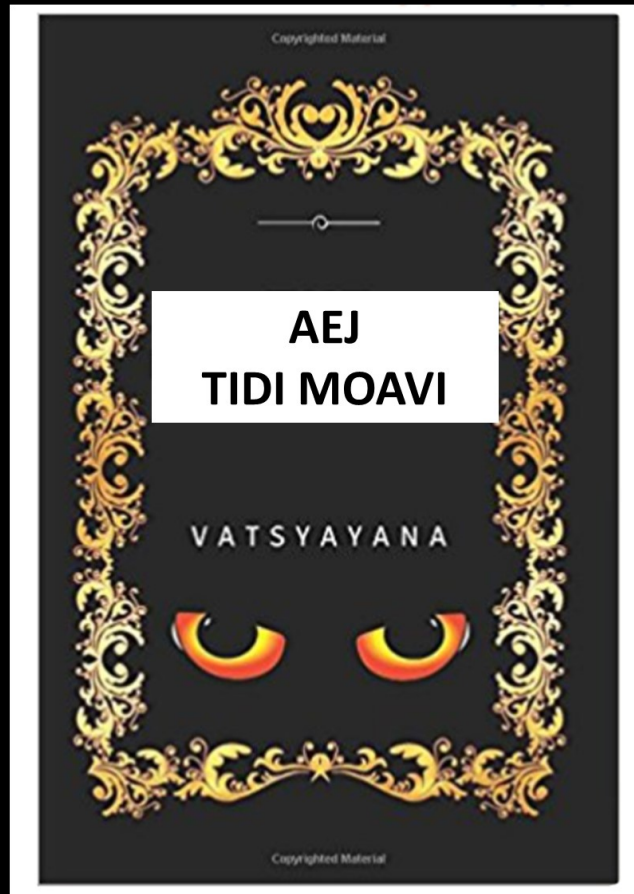
Ghose is a leading expert, and sought-after speaker, in quantum information science, as well as how to make the global science community more vibrant and inclusive. She is the founding director of the Laurier Centre for Women in Science and President of the Canadian Association of Physicists, and she served as Perimeter Instituteâ€™s first Diversity, Equity, and Inclusion Specialist.

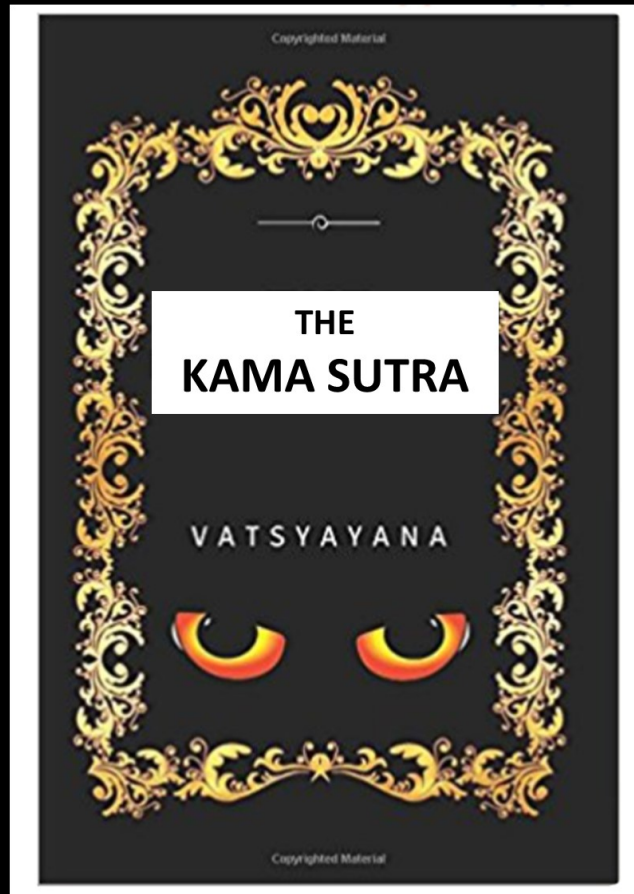
Among her many honours, Ghose is a TED Senior Fellow and member of the Royal Society of Canadaâ€™s College of New Scholars, Artists, and Scientists. In 2019, she was among 25 leading women scientists from around the world featured in a UNESCO exhibit in Paris.

The Quantum Revolution

Shohini Ghose
Wilfrid Laurier University







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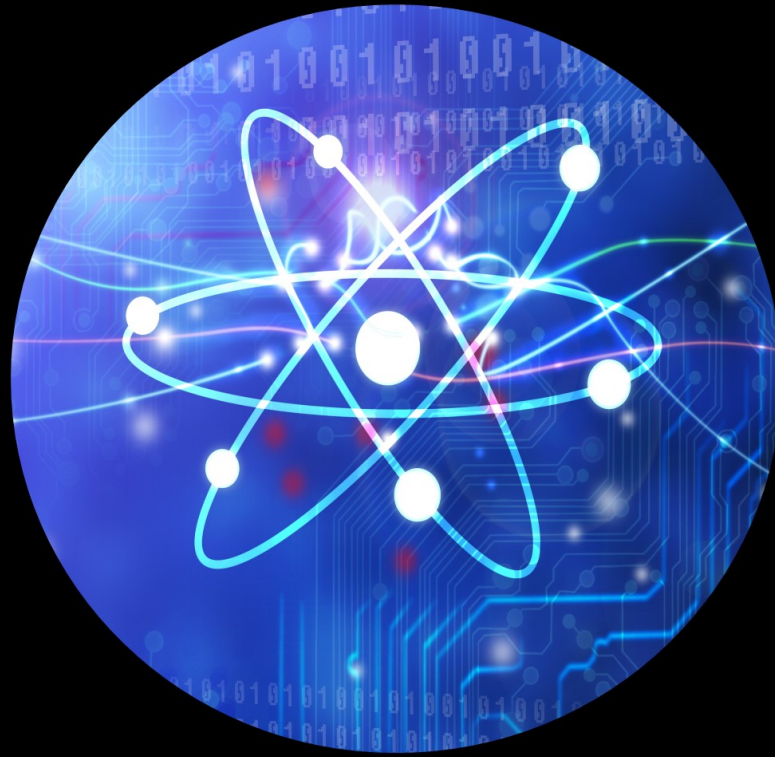
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Quantum uncertainty

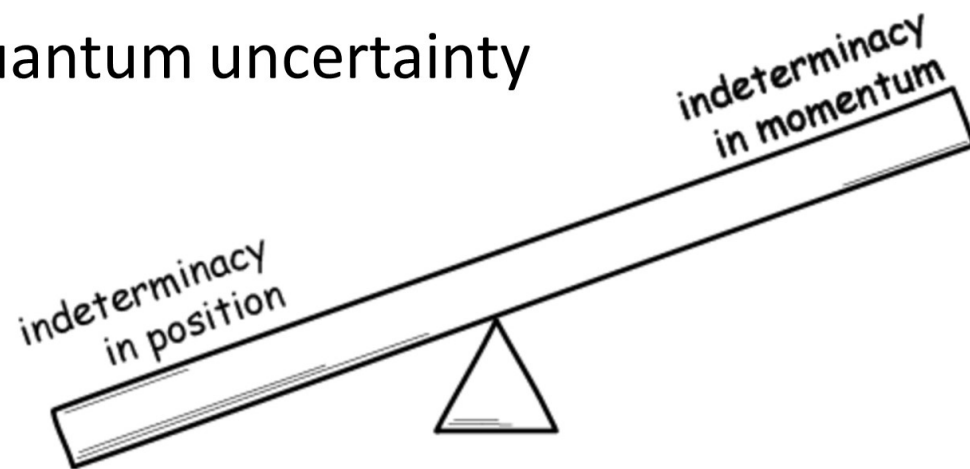
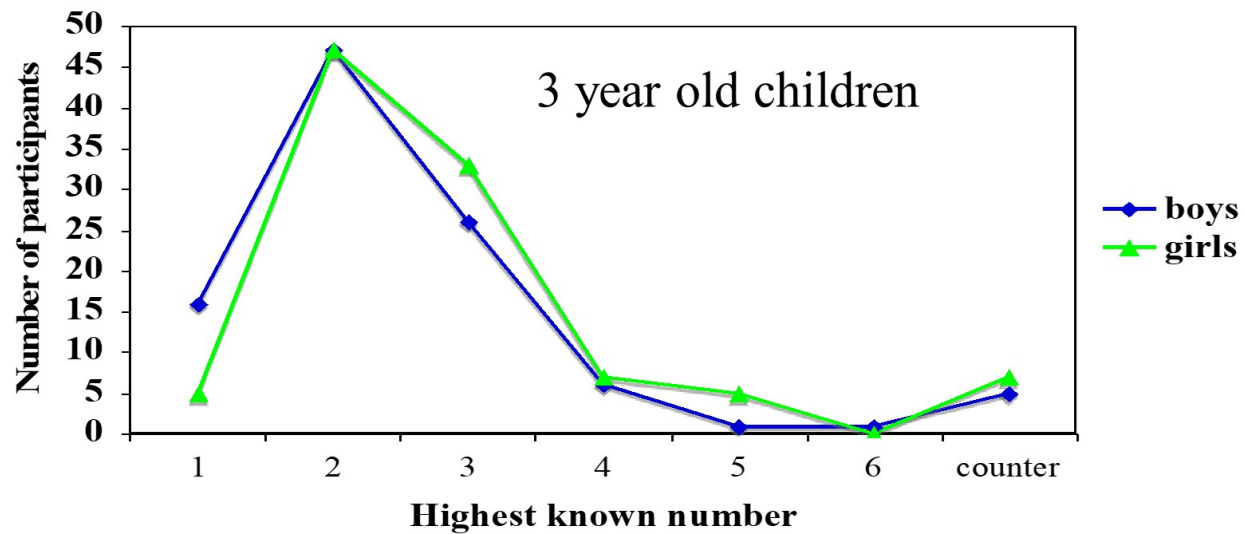


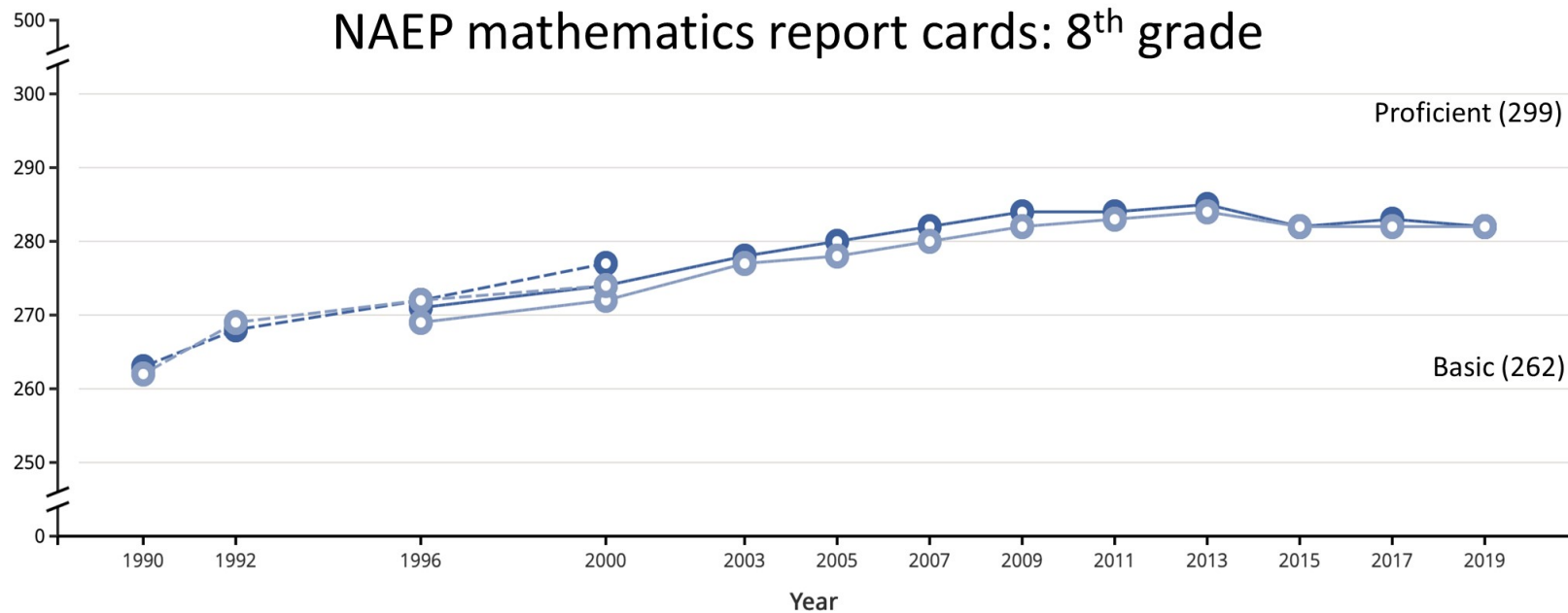
Image: J. Norton, pitt.edu





Average scale scores

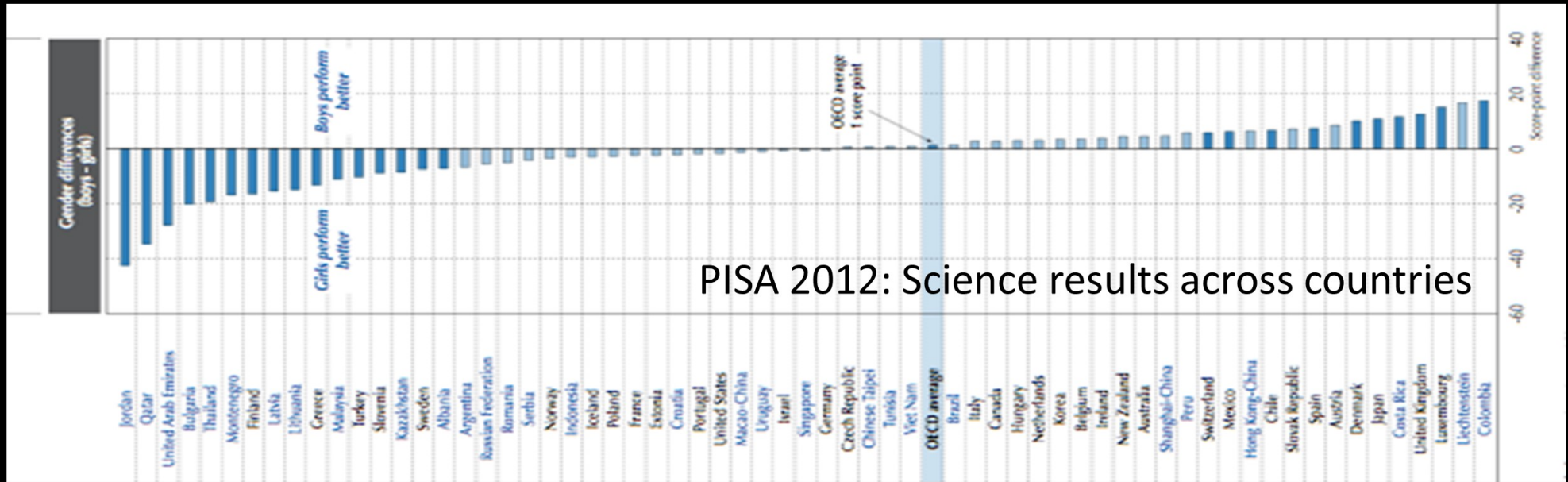
NAEP mathematics report cards: 8th grade



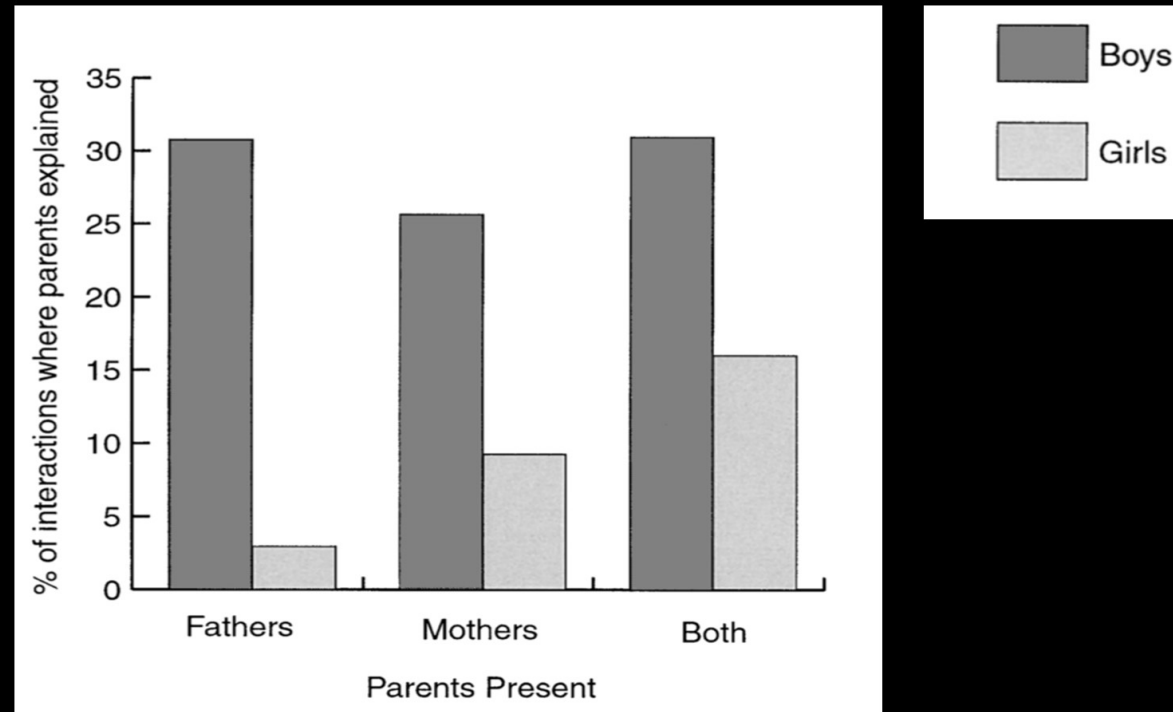
● Male ● Female

----- Accommodations not permitted

————— Accommodations permitted



Perceptions and environment Parents/mentors



Crowley, K., Callanan, M. A., Tenenbaum, H. R., & Allen, E. (2001). Parents explain more often to boys than to girls during shared scientific thinking. *Psychological Science*, 12(3).

What does a scientist look like?

What does a scientist look like?



www.open.ac.uk/invisible-witnesses

What does a scientist look like?



A. Bodzin, M. Gehringer, Breaking science stereotypes, Science and Children (2001)

Perceptions and environment

IUPAP Global Survey of physicists

Women were:

- Less likely to have adequate resources
- More likely to do majority of housework/childrearing
- More likely to experience slower career advancement

<https://www.aip.org/statistics/reports/global-survey-physicists>

Perceptions and environment

IUPAP Global Survey of physicists

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But women chose physics anyway because they love it!

<https://www.aip.org/statistics/reports/global-survey-physicists>



Cecilia Payne-Gaposchkin

Photo credit: Harvard University Archives

Quantum uncertainty

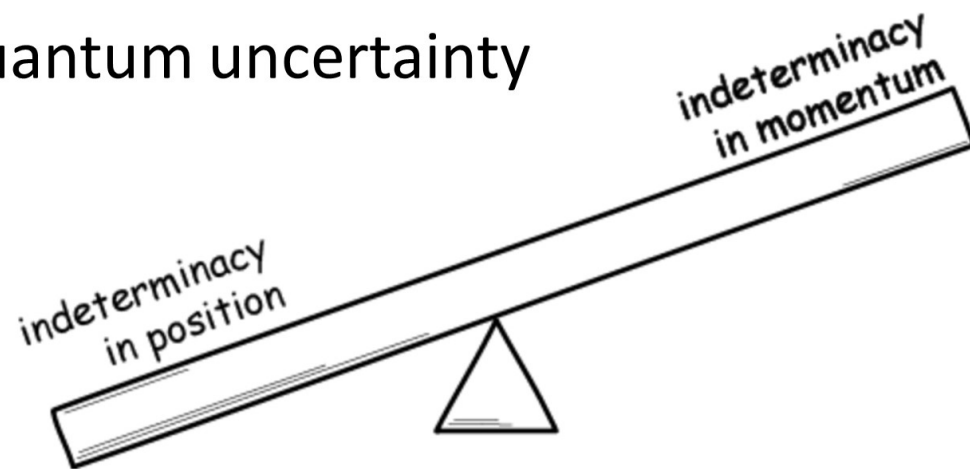
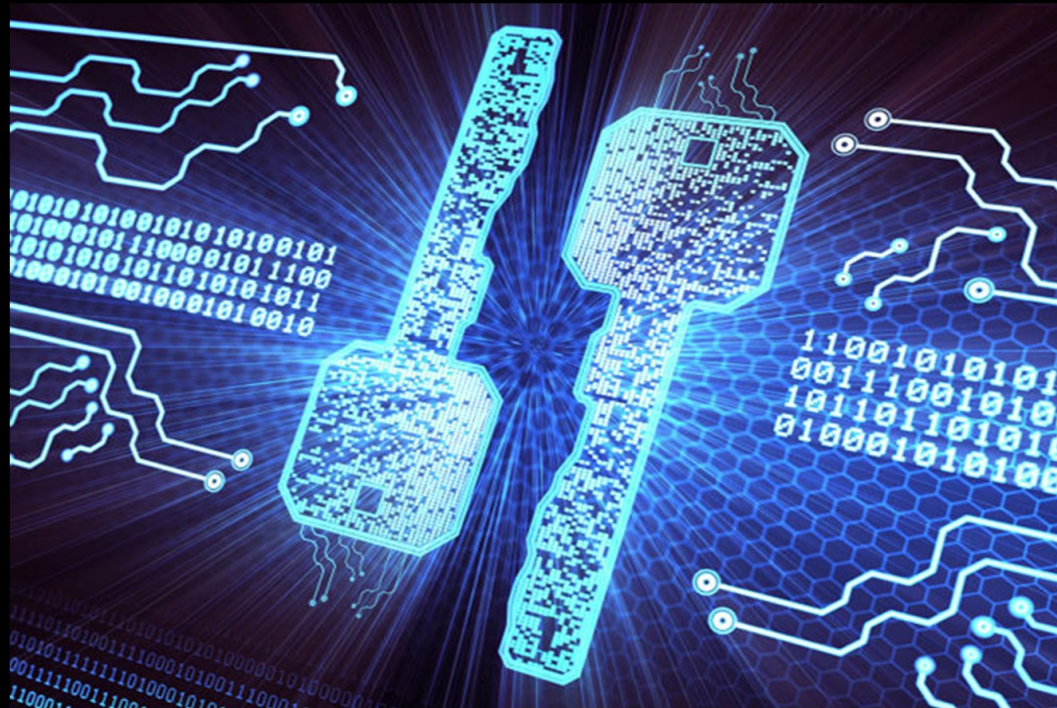
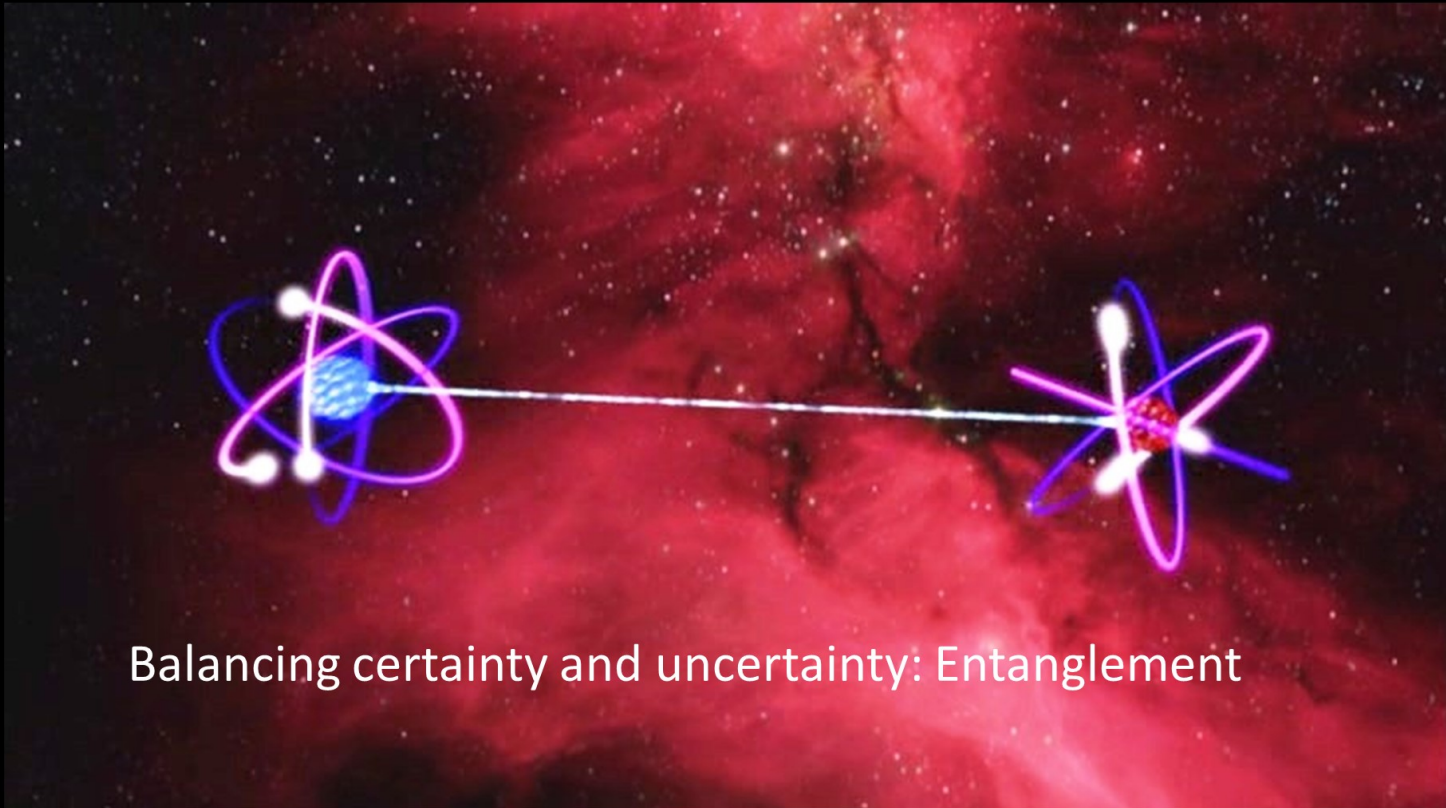
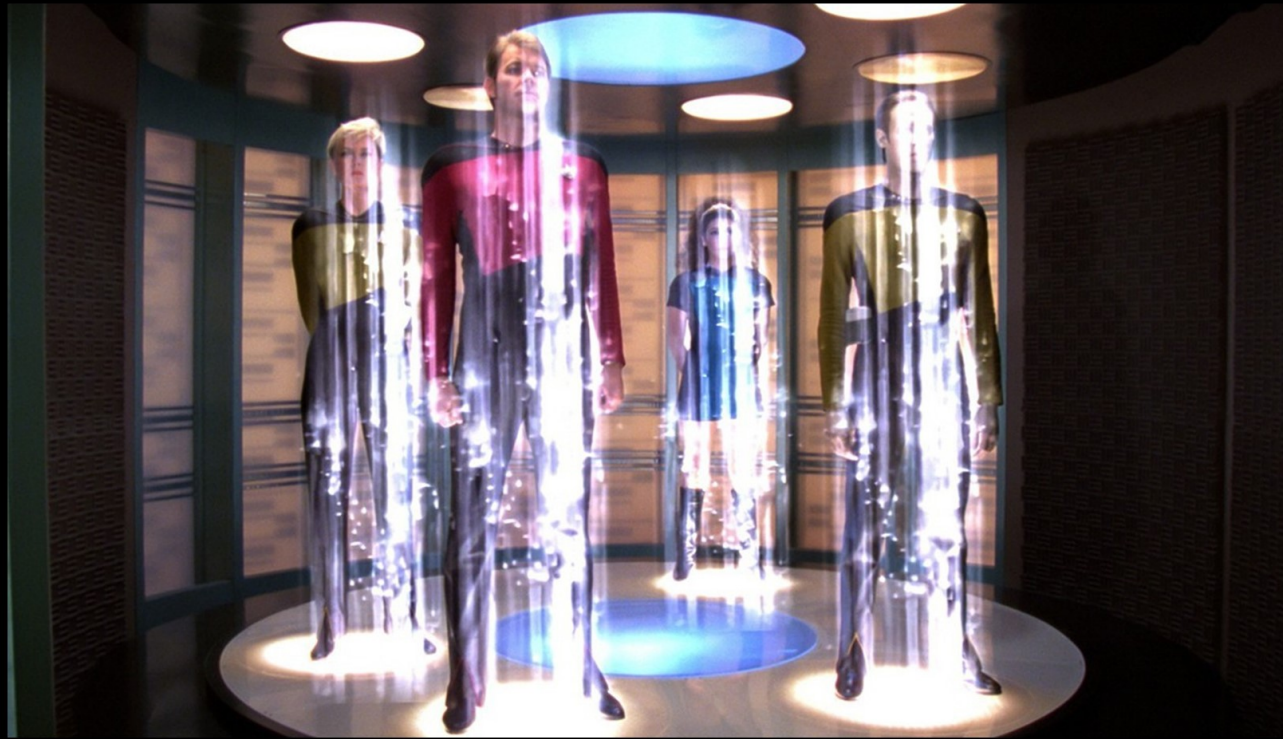


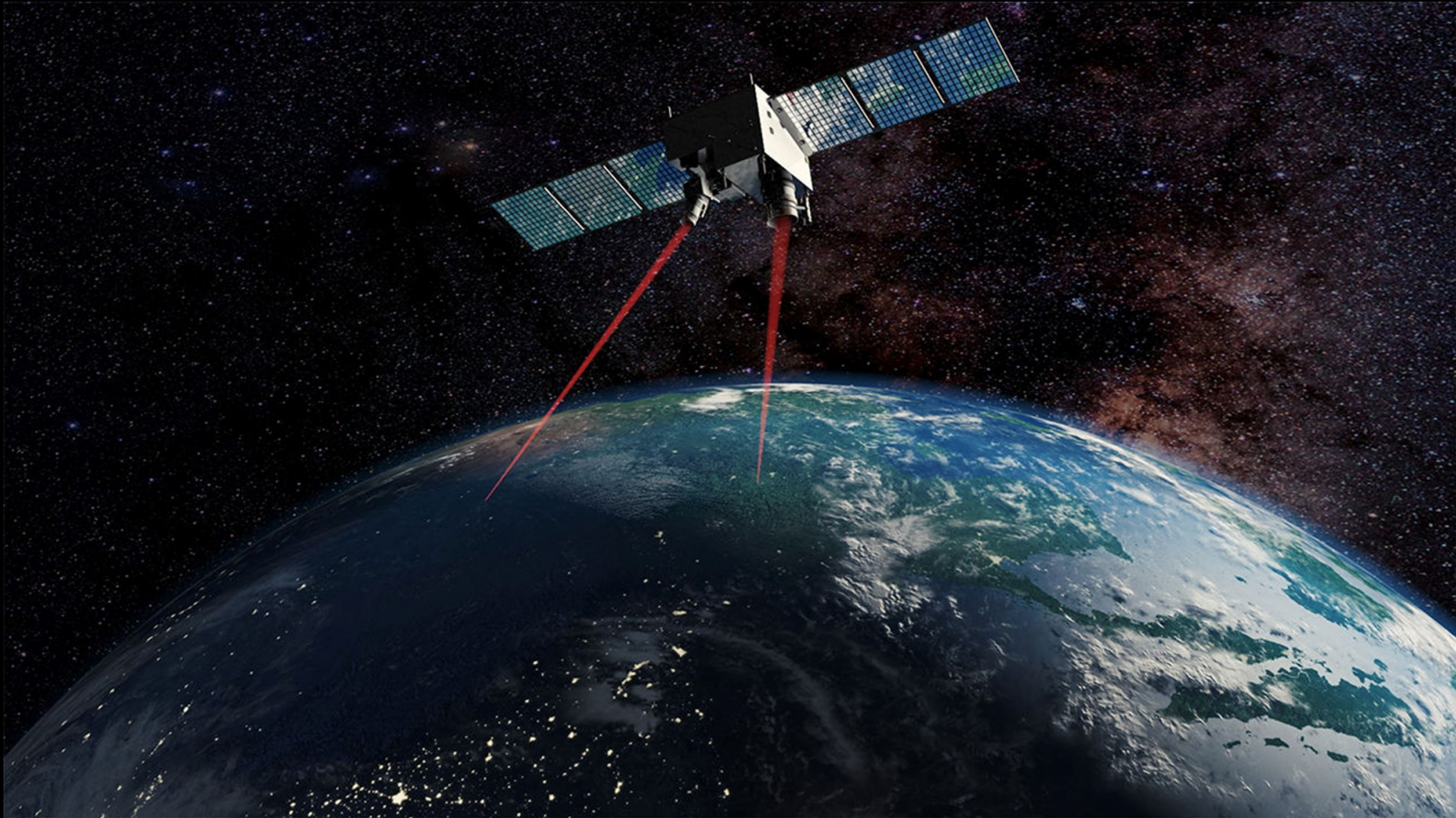
Image: J. Norton, pitt.edu





Balancing certainty and uncertainty: Entanglement





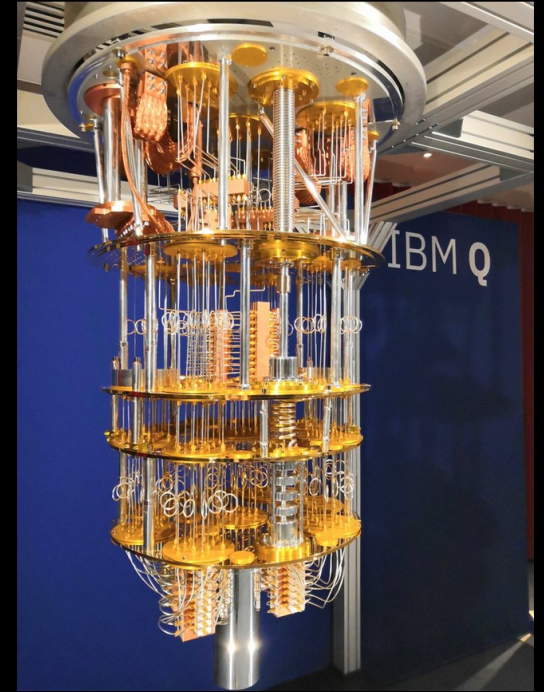
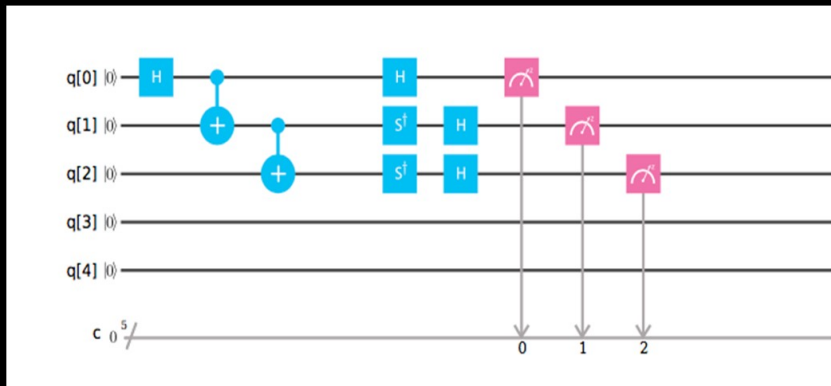


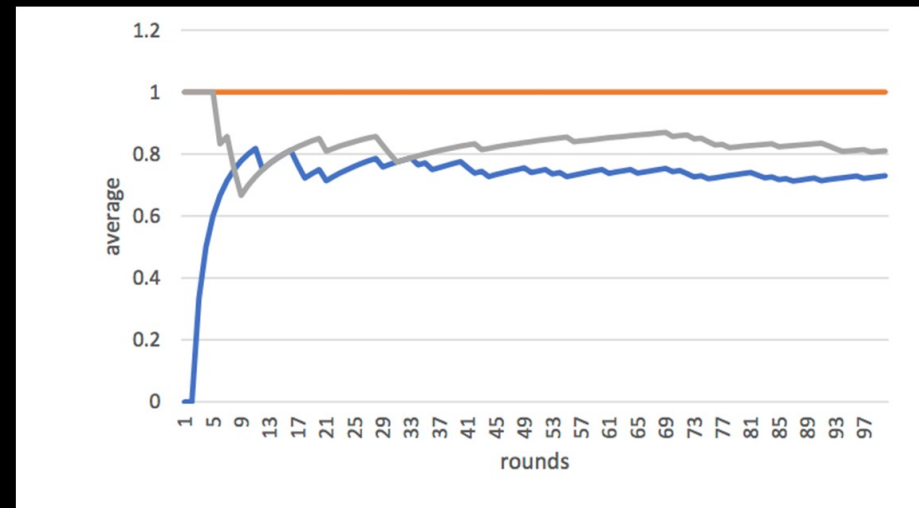
Image credit: IBM

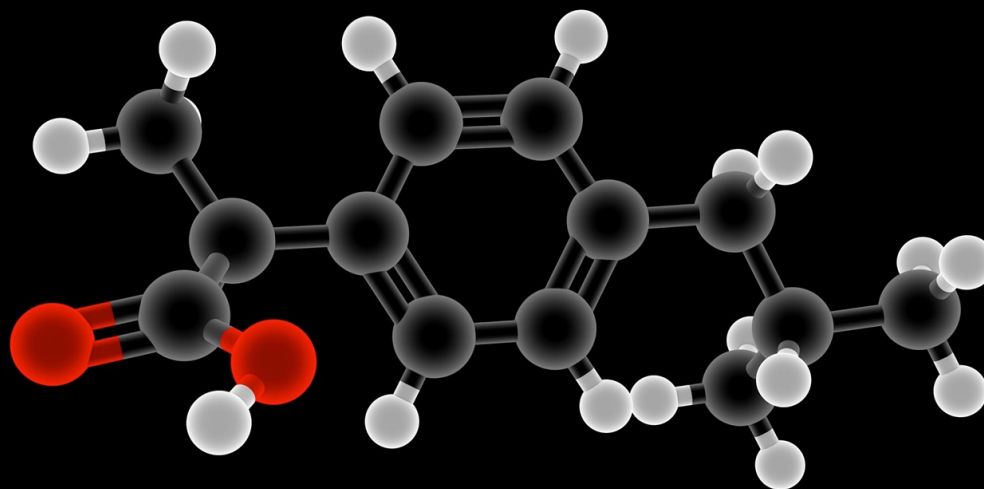
Quantum decision making



Classical success rate: 75%

Quantum success rate: 100%





Google

Google Search

I'm Feeling Lucky

Google offered in: [Français](#)

Image credit: Mark Duncan

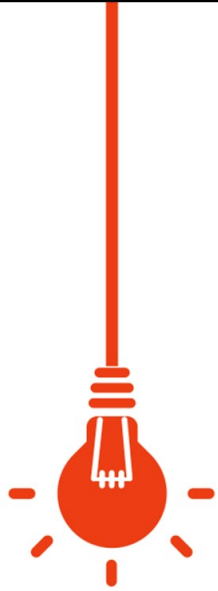
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Google Search

I'm Feeling Lucky

Google offered in: [Français](#)

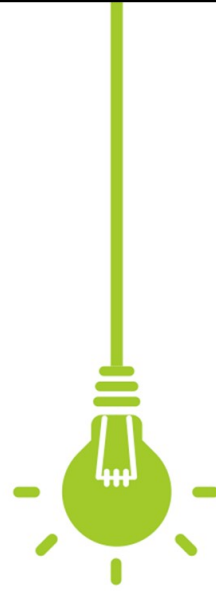
Image credit: Mark Duncan



COMMUNICATION



COMPUTING



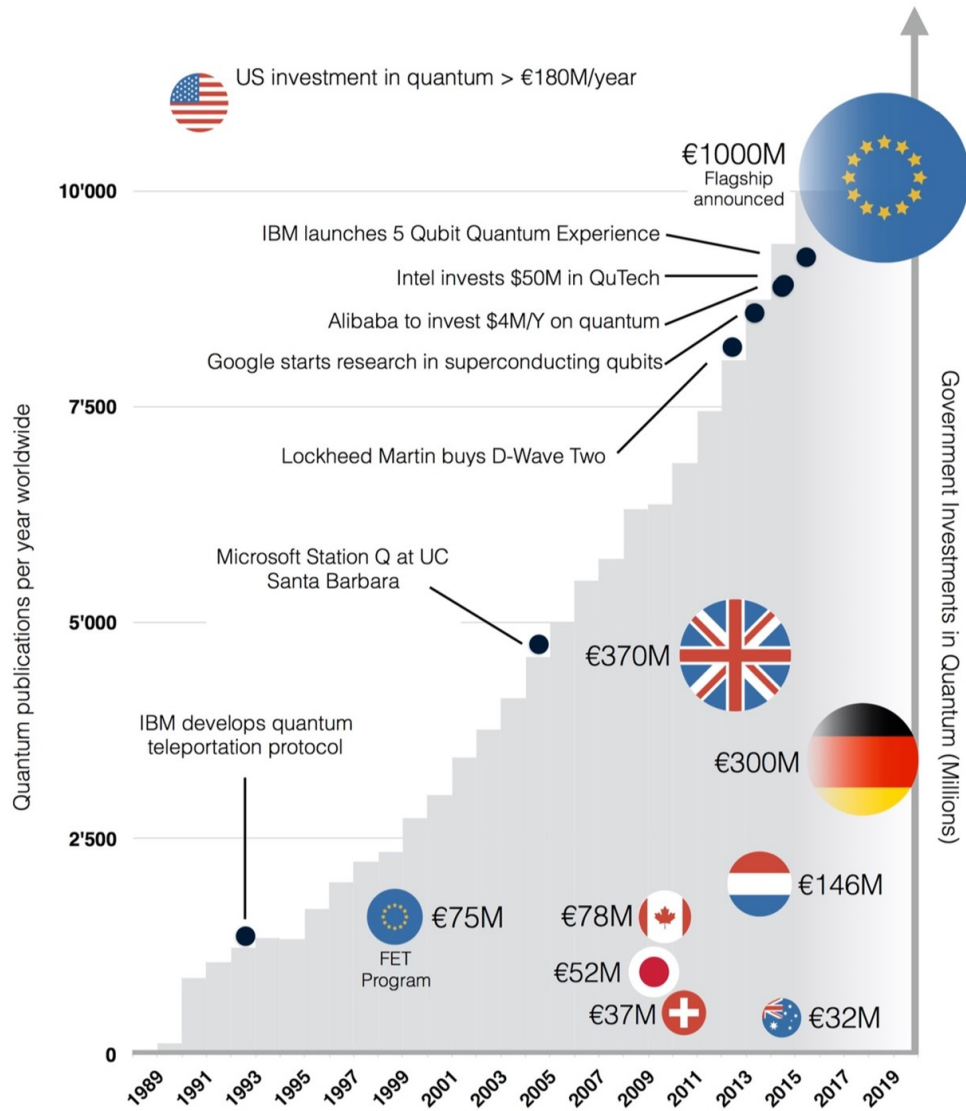
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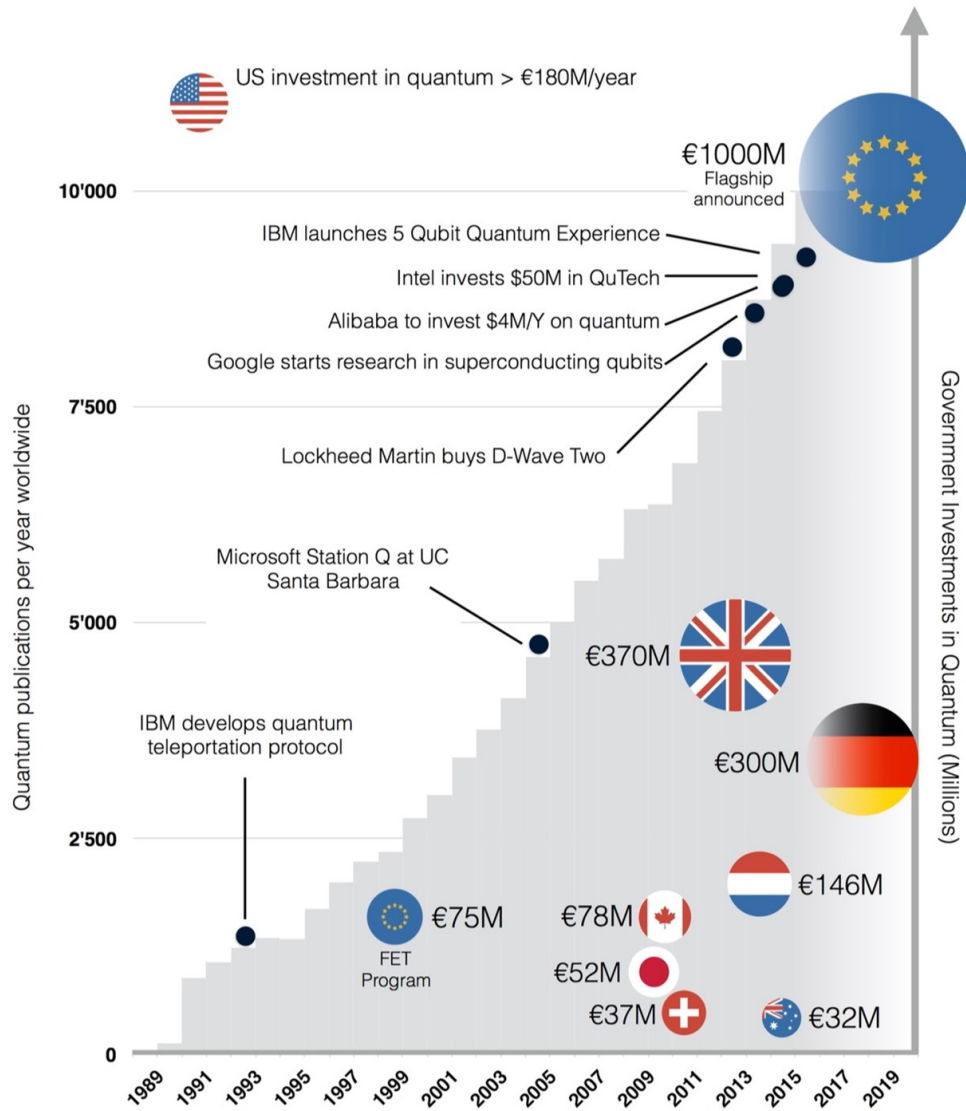


DESIGN

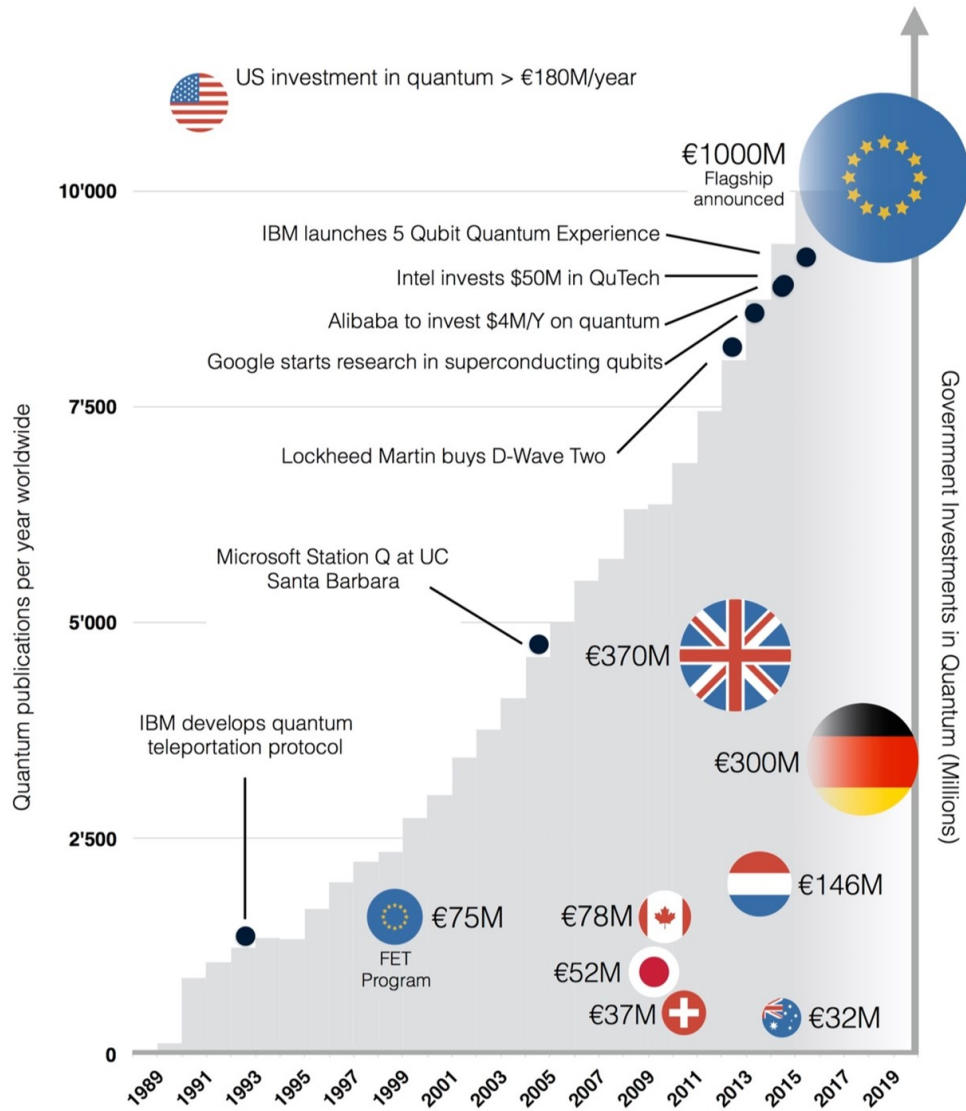


SCIENCE

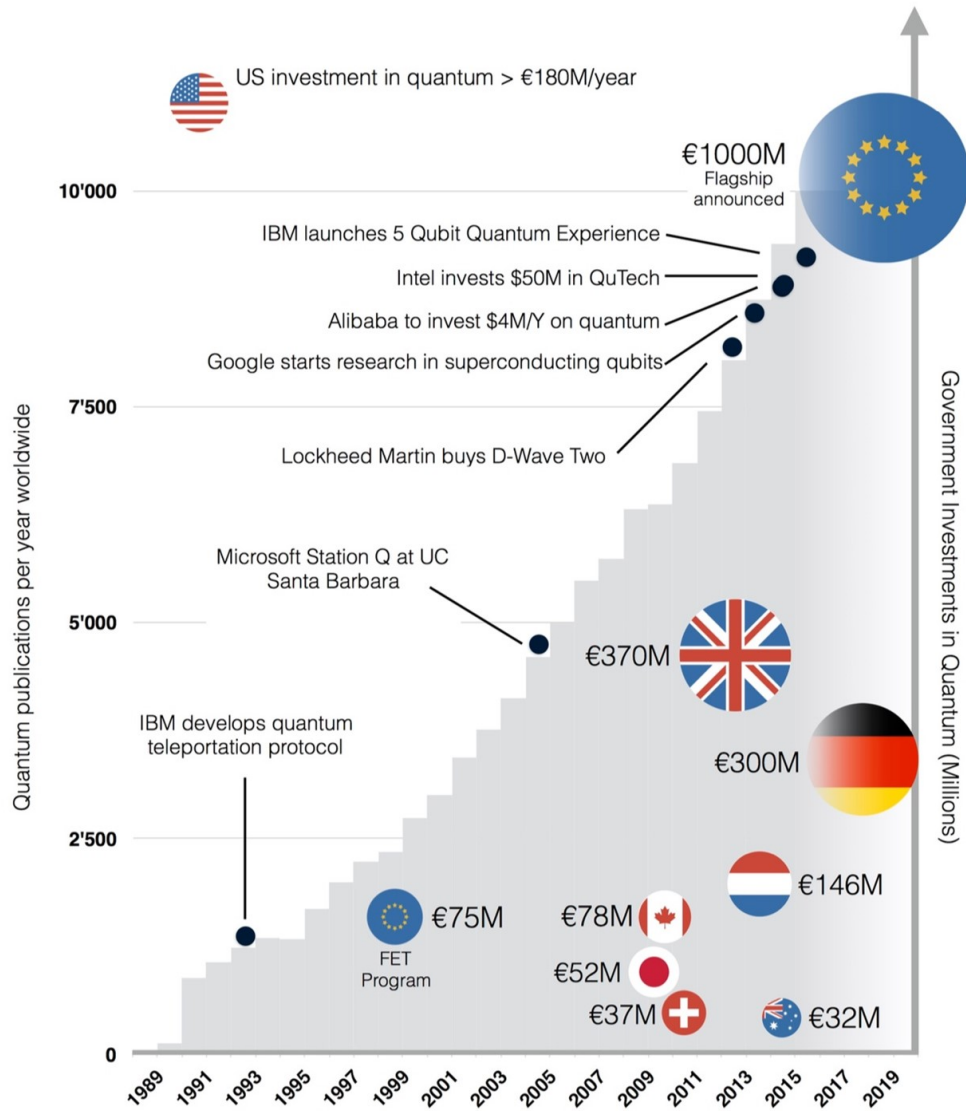




Germany > \$700M



India > \$1B
Germany > \$700M



China > \$10B
 India > \$1B
 Germany > \$700M

Software & Consultants

Quantum Computers

Enabling Technologies

Quantum tech market: \$18B by 2024 ?





International Conference on Women in Physics
Waterloo, Canada 2014