Quantum Technologies courses for Industry

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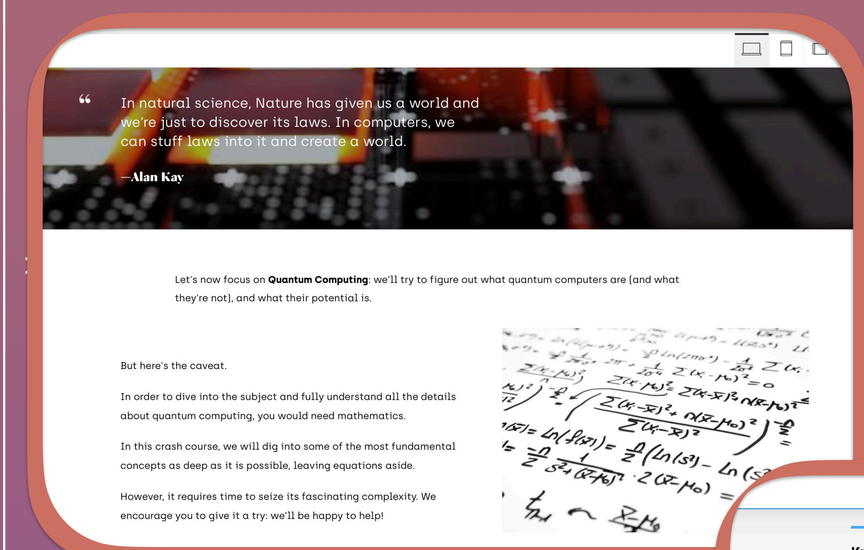
MOTIVATION

Quantum technologies, from computing to sensing to communication, are expected to massively impact multiple sectors in the near future (transport, energy, pharmaceutical, …), involving not only academics but society at large. In order to seize the rapid changes, companies need talent with education in quantum technology at all levels, able to incorporate these emerging technologies into existing businesses. New specific curricula in universities have started to narrow the gap, however it is too early for them to fill the **current shortage of a skilled quantum workforce**. **QTIndu** (Quantum technology courses for Industry) is a **solution** that creates **short-term training programs in quantum technologies for professionals from other fields**. The material is tailored to the requirements of enterprises from several business sectors and developed according to the different background of various professional roles. We present below our contribution to the project.

INSPIRATION QUANTUM

Executive ed.

We introduce the basic concepts of quantum science to prepare you for your quantum computing journey, without the use of mathematical formalism. At the end of the course, you will be able **to distinguish hyped or misleading from accurate sources of information on quantum technologies**.

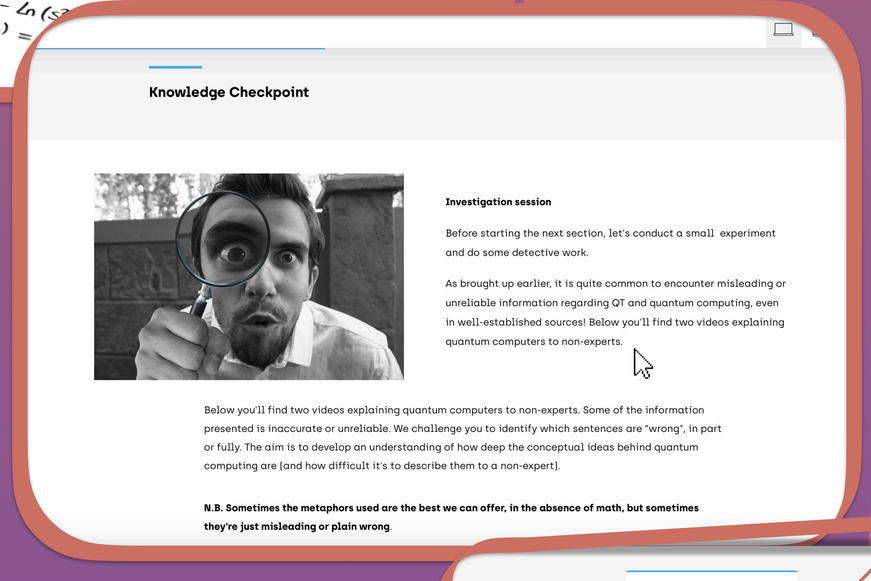


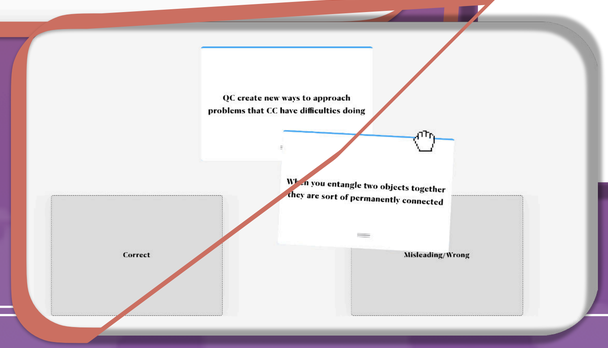
interactivity

scientific accuracy

Audience: business strategists, managers, policymakers, marketing personnel, job seekers.
No previous background in physics or STEM

Learning outcomes:
- ► why quantum computing is different from classical computing
- ► distinction between fault-tolerant and near term quantum device
- ► applications of near term devices in the coming years





QUANTUM COMPUTING- THE SOFT WAY

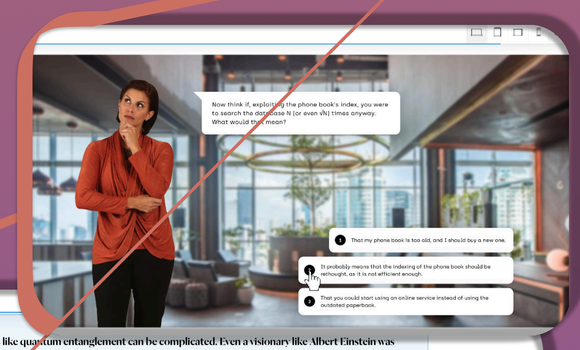
Hands-on

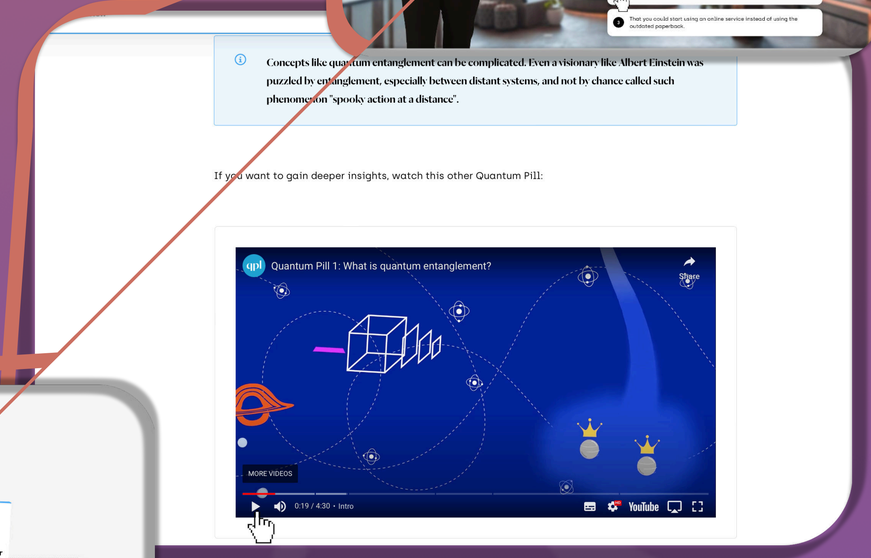
From qubits, gates and quantum circuits to the effect of noise in near term devices, the course is a hands-on practical introduction to the basics of quantum computing **to start working with quantum software NOW.**

A**udience:** software engineers, computer scientists, project managers, job seekers. Knowledge of basic math and linear algebra, no background in physics.

Learning outcomes:
- ► high-level understanding of basic concepts in quantum computing and how to interpret a quantum circuit
- ► limits and bottlenecks of near term devices
- ► assess the platforms available in terms of software and hardware

playful approach



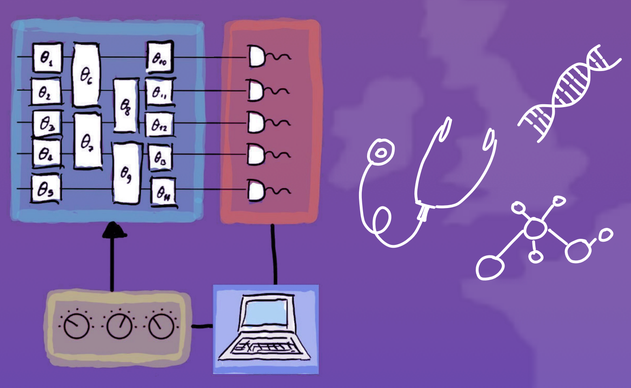


different media tools

QUANTUM FOR LIFE SCIENCES

Employee ed.

What are the potentials of quantum technologies for the healthcare and life science business sector?
An overview on open problems in the field, and how they are being addressed by these new technologies in existing collaborations.



Executive ed.

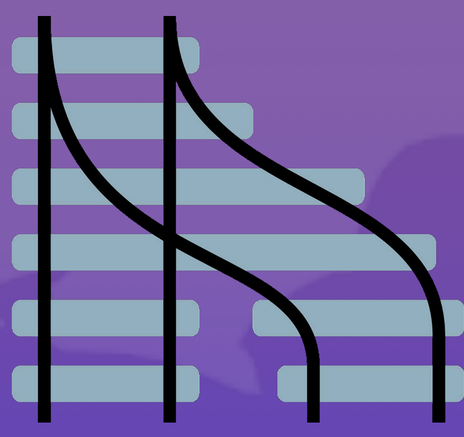
Audience: clinicians, hospital managers, project managers in life science research labs. No previous background in physics or mathematics.

Goals:
- ► identify strategic use-cases

fig. adapted from PRX Quantum 2, 040342 (2021)

How can quantum technologies help professionals in the healthcare and life science fields do their job better?
Analysis of use cases of quantum technologies in clinical research and in drug design, how they will provide an advantage and what are the current limitations.

Track 1: clinical
Audience: clinical researcher, chemists, biologists. Knowledge of basic math and chemistry



Track 2: drug discovery
Audience: computational biologists, engineers, life science researcher. Basic knowledge of classical computational methods, no background in physics

Goals:
- ► establish a common vocabulary to successfully work with quantum experts
- ► start a collaboration

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