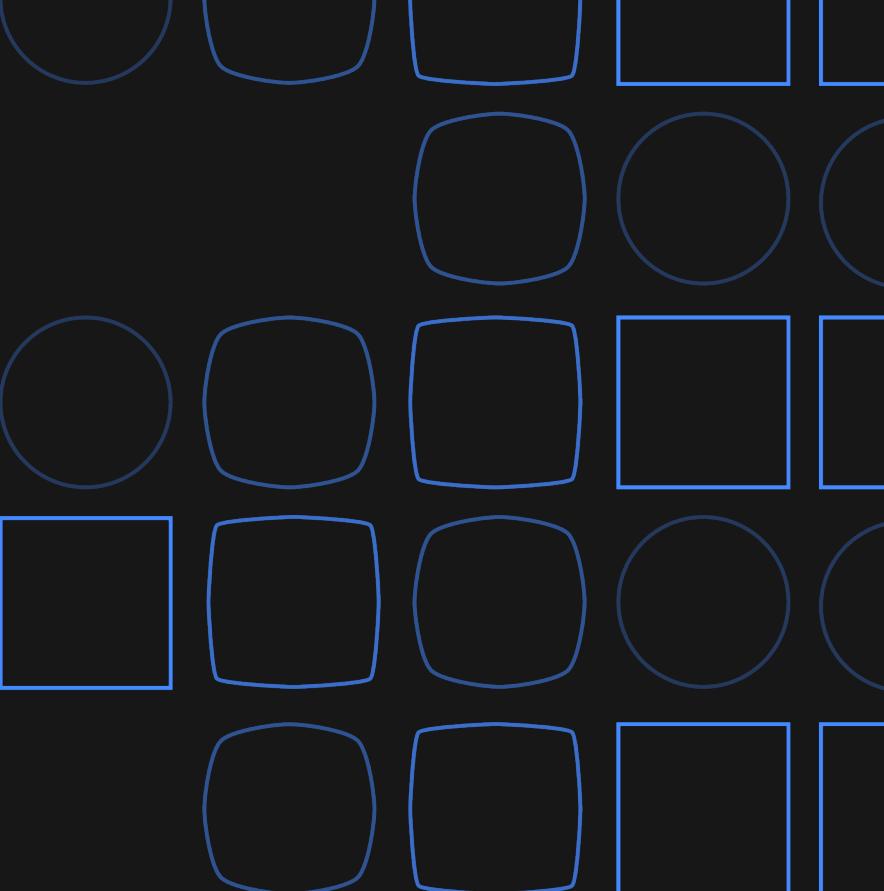


Qiskit workshop for PC5228

Junye Huang

Quantum Developer Advocate



Schedule

Date	Start	End	Subject
21 Aug	12:00	13:30	Introduction to Qiskit and IBM Quantum Experience
18 Sep	12:00	14:00	Quantum algorithms: Deutsch-Josza and Grover algorithm
6 Nov	12:00	14:00	Quantum applications: Simulating Molecules using Variational Quantum Eigensolver (VQE)

All sessions will be recorded

Session 2: Quantum algorithms: Deutsch-Jozsa & Grover's algorithms

Start	End	Duration	Subject
12:00	12:10	0:10	Opening and Overview
12:10	12:50	0:40	Deutsch-Jozsa algorithm
12:50	13:00	0:10	Break
13:00	13:50	0:50	Grover's algorithm
13:50	14:00	0:10	IBM Quantum Updates: Roadmap, Practicums, Internships

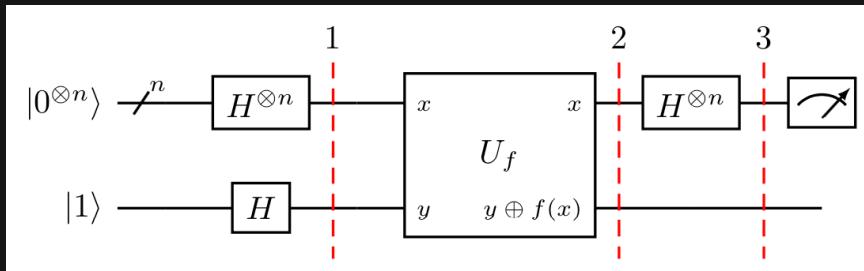
Deutsch-Jozsa algorithm

Deutsch-Jozsa problem

$f(\{x_0, x_1, x_2, \dots\}) \rightarrow 0 \text{ or } 1$, where x_n is 0 or 1

Determine a hidden function to be constant or balanced.

Deutsch-Jozsa algorithm



[Qiskit textbook chapter](#)



[Circuit composer demo](#)



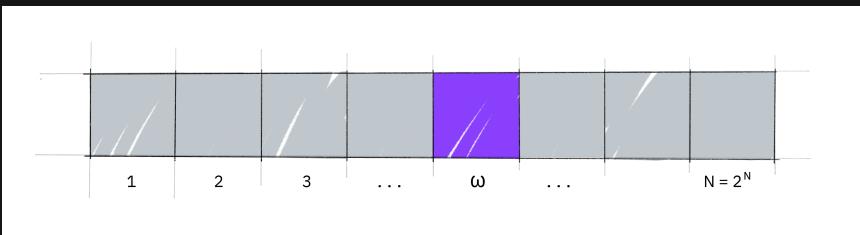
[Qiskit notebook demo](#)



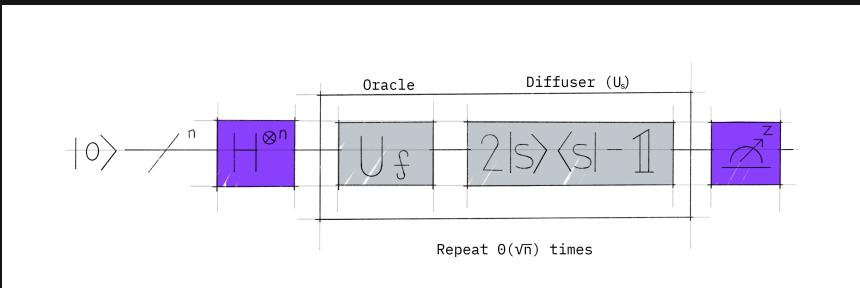
[Qiskit GSS lecture](#)

Grover's algorithm

Unstructured search problem



Grover's algorithm



[Qiskit textbook chapter](#)



[Circuit composer demo](#)



[Qiskit notebook demo](#)



[Qiskit GSS lecture](#)

Qiskit Global Summer School

IBM Quantum

27 lectures

- From qubits to quantum chemistry applications.

Course materials

- Video recordings
- Lecture notes
- Hands-on labs

Course website

The screenshot shows the homepage of the Qiskit Global Summer School website. At the top, there is a navigation bar with the Qiskit logo, followed by links for Overview, Learn (which is highlighted in purple), Community, and Documentation. Below the navigation bar is a large, light-gray grid area. Overlaid on this grid is the title "Introduction to Quantum Computing and Quantum Hardware" in a large, black, serif font. The bottom portion of the page is a solid black background.

Scaling IBM Quantum technology



IBM Q System One (Released)	(In development)	Next family of IBM Quantum systems		
2019	2020	2021	2022	2023 and beyond
27 qubits <i>Falcon</i>	65 qubits <i>Hummingbird</i>	127 qubits <i>Eagle</i>	433 qubits <i>Osprey</i>	1,121 qubits <i>Condor</i>
Key advancement	Key advancement	Key advancement	Key advancement	Key advancement
Optimized lattice	Scalable readout	Novel packaging and controls	Miniaturization of components	Integration
				Build new infrastructure, quantum error correction

OpenNodes-IBM Industry Practicums

Project 1: IBM Quantum Case Studies

With a focus on developing potential applications of quantum computing in finance for a 3-5 year future, you will work on extending the tutorial content in [IBM Qiskit's developer documentation](#). Learn and explore new use-cases while receiving guided mentorship from experts to test the validity of ideas and concepts.

Duration: 28 Sep – 9 Nov (1.5 Month)

Individuals Selected: 5-7 students

Selection Criteria

- *Python development experience.*

Demonstrate this by sharing your Github account or specific repositories of note.

- *An understanding of finance*

Preferable if you have done financial modelling or options pricing with Python. Otherwise, a conceptual understanding of options pricing or portfolio optimisation will do.

Project 2: Skills Roadmap

Develop a skills roadmap that charts the direction for future content in Quantum technology and acts as an educational resource for students to gain proficiency in this nascent field. This roadmap will guide future students and will be instrumental to IBM's educational efforts, enabling them to kickstart their learning in Quantum technology

Duration: 28 Sep – 9 Nov (1.5 Month)

Individuals Selected: 5 students

Selection Criteria

- *Experience doing desktop research of an academic nature or consulting cases*
- *Demonstrate interest in Quantum Technologies*

Share with us more about your background through a short write-up.

Industry Practicums

- 6-week project with mentorship
- 5-7 students from different universities (NTU, NUS, SMU, SUTD, etc.)
- Deadline: 28 September
- Apply [here](#)

Project Mentors



Junye Huang
Quantum Developer
Advocate,
IBM Quantum and Qiskit

Has a deep passion in making Quantum Computing accessible to everyone. This is done through creating resources and opportunities to work and interact with Quantum Technologies.



Professor Paul Griffin
Associate Professor,
Singapore Management University

Has extensive experience in finance industry from both academic and scientific background. Currently works on the intersection between technology and its applications in financial services.

IBM Quantum Internships

Internships

- Research Intern
- Developer Intern
- Engineer Intern

Deadline: Nov 2, 2020

More details [here](#).

*Interns from the 2019 QURIP
summer program.*

