Attendee Guide
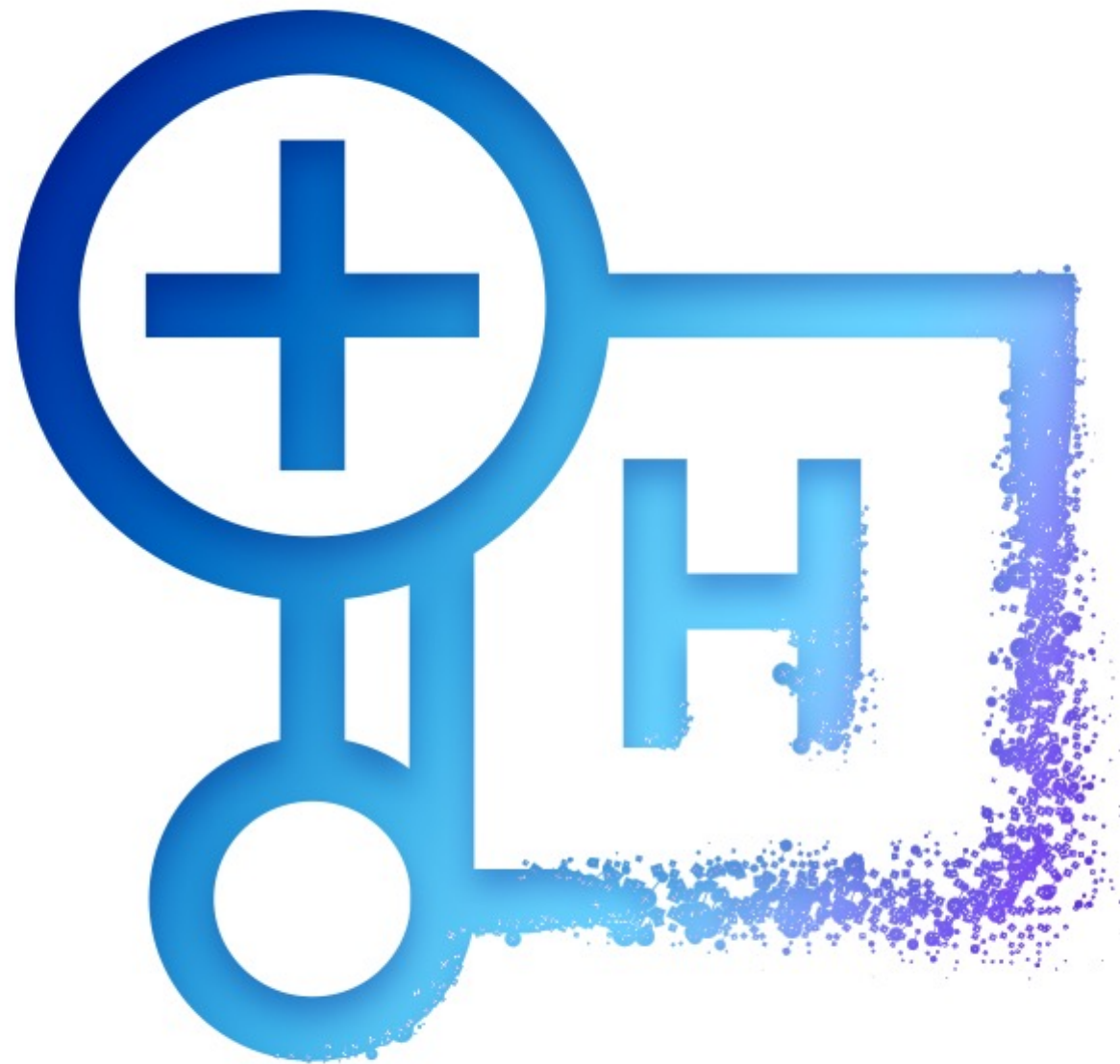
Qiskit Global Summer School 2023: Theory to Implementation

July 17 – July 28

#QGSS2023

Qiskit | Global Summer School 2023

Index

IMPORTANT!

Please make sure and use Google Chrome for headache-free course access.

QUICKLINKS

Key Locations

Discord Server

Lab Portal *[Live starting July 17]*

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About the Summer School

The Qiskit Global Summer School 2023 is a two-week intensive summer program designed to empower the quantum researchers and developers of tomorrow with the know-how to explore the world of quantum computing, as well as refresh and sharpen the industry professional's skills. This fourth-annual summer school will focus foundationally on quantum computing by taking a back-to-basics approach, with a specific look at making the transition from theory to implementation.

Please read through this Attendee Guide to find answers about the structure, setup, agenda, and resources that accompany the Summer School. This is not a passive course - active participation is key to making it a success. Grab a notebook and a pen and find your favorite chair. The Qiskit Global Summer School is just about here.

Resources

Pre-Requisites

Minimal prerequisites are required for the Qiskit Global Summer School. To follow most of the course, you will need to understand the basics of linear algebra, including vectors and matrices and how to work with them, as well as notions such as linear independence, bases, and dimension. You will also need to know how complex numbers work and be comfortable with some basic mathematical concepts, such as sets and functions. Here, you can find these foundational concepts explained.

To make the most out of the lectures, may also consider looking through the linear algebra prerequisites section of the Qiskit Textbook and brushing up on Python programming .

Quantum Computing

| [Read Textbook] | **Quantum Computing for the Quantum Curious** by Hughes C et al |
[Read Textbook]	**Learn Quantum Computing Using Qiskit** by IBM Quantum
[Join Course]	**Introduction to Quantum Computing and Quantum Hardware** by IBM Quantum
[Buy Textbook]	**Quantum Computation and Quantum Information** by Nielsen & Chuang

Additional Resources

Suggested readings will be provided in Discord & more resources are available online at qiskit.org/learn!

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Lecturers and Lab Creators

Our expert speakers from around the world include industry leading researchers and developers in Quantum Computing – representing the pioneering work of IBM and IBM Quantum.
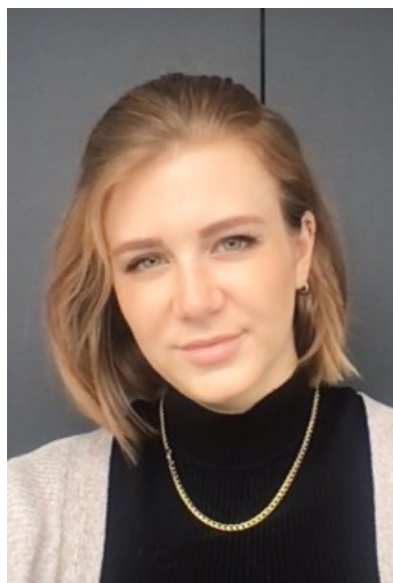
Olivia Lanes

North American Lead, Qiskit & IBM Quantum Community

John Watrous

Technical Director of Education, IBM Quantum

Abby Mitchell

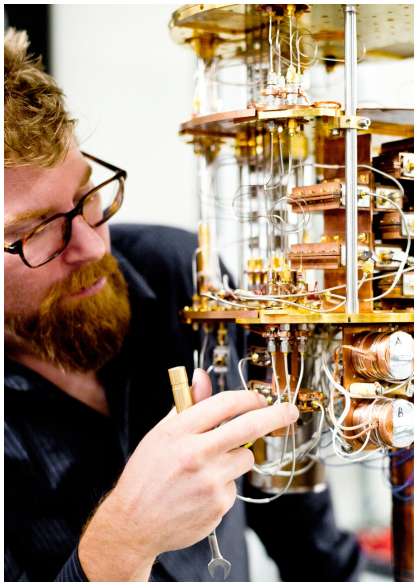**IBM Quantum Developer Advocate**

Zlatko Minev

IBM Quantum Physicist

Lecturers and Lab Creators

Our expert speakers from around the world include industry leading researchers and developers in Quantum Computing – representing the pioneering work of IBM and IBM Quantum.

Nicolas Bronn

IBM Quantum Research Scientist

Kevin Sung

IBM Quantum Researcher and Software Developer

Kaelyn Ferris

IBM Quantum Researcher

Omar Shehab

IBM Quantum Research Scientist

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Week 1 Schedule

JULY 17 Monday	JULY 18 Tuesday	JULY 19 Wednesday	JULY 20 Thursday	JULY 21 Friday
9:00 AM EDT Global Summer School Welcome & Kickoff	**9:00 AM EDT** Quantum Circuits *Speaker: John Watrous*	**9:00 AM EDT** Entanglement in Action *Speaker: John Watrous*	**9:00 AM EDT** Quantum Query Algorithms *Speaker: John Watrous*	**9:00 AM EDT** Phase Estimation and Factoring *Speaker: John Watrous*
11:00 AM EDT Single Systems *Speaker: John Watrous*	**11:00 AM EDT** Lab 1: Qiskit 101 Abby Mitchell	**11:00 AM EDT** Lab 2: Creating Entanglement with Qiskit Nick Bronn	**11:00 AM EDT** Foundations of Quantum Algorithms *Speaker: John Watrous*	**11:00 AM EDT** Lab 3: Diving into Quantum Algorithms Kaelyn Ferris
1:00 PM EDT Multiple Systems *Speaker: John Watrous*	**1:00 PM EDT** Live Q&A Session with Abby Mitchell	**1:00 PM EDT** Live Q&A Session with Nick Bronn	**1:00 PM EDT** Live Q&A Session with Olivia Lanes & John Watrous	**1:00 PM EDT** Live Q&A Session with Kaelyn Ferris
3:00 PM EDT Live Q&A Session with Olivia Lanes & John Watrous				

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Week 2 Schedule

JULY 24 Monday	JULY 25 Tuesday	JULY 26 Wednesday	JULY 27 Thursday	JULY 28 Friday
	9:00 AM EDT Introduction to Quantum Noise Part 1 *Speaker: Zlatko Minev*	**9:00 AM EDT** Iterative Quantum Phase Estimation: Moving Beyond Traditional QPE *Speaker: Kaelyn Ferris*	**9:00 AM EDT** Noise Mitigation Part 1 *Speaker: Nick Bronn*	
11:00 AM EDT Quantum Computing Hardware and Super Conducting Circuits *Speaker: Olivia Lanes*	**11:00 AM EDT** Introduction to Quantum Noise Part 2 *Speaker: Zlatko Minev*	**11:00 AM EDT** Variational Quantum Eigensolver *Speaker: Omar Shehab*	**11:00 AM EDT** Noise Mitigation Part 2 *Speaker: Nick Bronn*	**11:00 AM EDT** Lab 6: Contributing to Qiskit Abby Mitchell
1:00 PM EDT Live Q&A Session with Olivia Lanes & John Watrous	**1:00 PM EDT** Live Q&A Session with Zlatko Minev	**1:00 PM EDT** Live Q&A Session with Omar Shehab	**1:00 PM EDT** Lab 5: Noise Mitigation Kevin Sung	**1:00 PM EDT** Closing Ceremony/ Panel *Speaker: All Lecturers*
		3:00 PM EDT Lab 4: Iterative Quantum Phase Estimation Kevin Sung	**3:00 PM EDT** Live Q&A Session with Kevin Sung	

Labs and Lectures

The school will include 12 in-depth lectures and 5 live graded laboratory exercises. There will be live Q&A sessions, and our team of quantum computing experts will provide hands-on mentorship throughout the school. **Participation and the completion of at least one lab are required in order to receive a certificate of participation from the Summer School,** with optional activities available to enhance your Summer School experience.

The schedule is not fixed, aside from final lab submission deadlines, and **all students can participate on the schedule that works best for them**. Lectures and lab sessions will all be recorded and available for live participation and post viewing, as well as the daily Q&A sessions.

Students should anticipate a minimum time commitment of 30 hours for the full Summer School, but we recommend planning on 40 hours of participation, with additional time for discussion and collaboration with other students.

Lectures

- Live Q&A will be hosted each day following the lectures - questions can be asked live or submitted on Discord
- Be an active audience member - take notes along with the lecturers!

Labs

Lab portal will be live by July 17th.
- Demonstrating lecture material with hands-on exercises on quantum programming using Qiskit
- Pre-recorded session is accompanied by problem set exercise

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Lab Access & Information

**Labs will be available in the IBM Quantum platform starting July 17.**

Each lab is made up of multiple exercises, with an estimated time to complete of 1-3 hours per lab. Exploratory exercises are not graded, but all others count towards your final grade.

To achieve a passing grade and acquire a badge of Quantum Excellence, **a minimum score of 75% or more is required** (*23/31 total exercises*).

Access & Verification

In order to access the channels in the discord, all students must select the "Join here" button in the welcome channel on discord. This button will confirm your status as a student in the Summer School. As long as your IBM Quantum ID is the same email you registered with, you will have full access to the lab portal and all related Discord channels with in 24 hours of confirming your status.

Make sure and log out of you account and re-login, refreshing your browser, once you are verified. This is a required final step in order to have access to lab exercises.

IBM Quantum without verification

IBM Quantum WITH verification
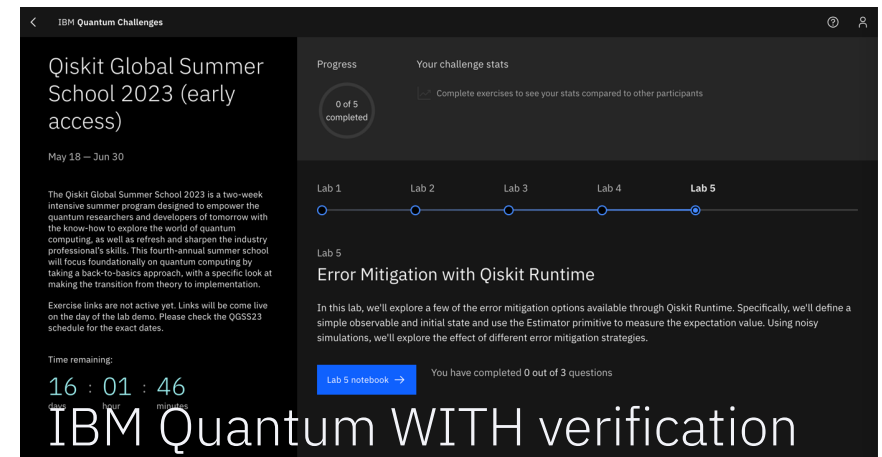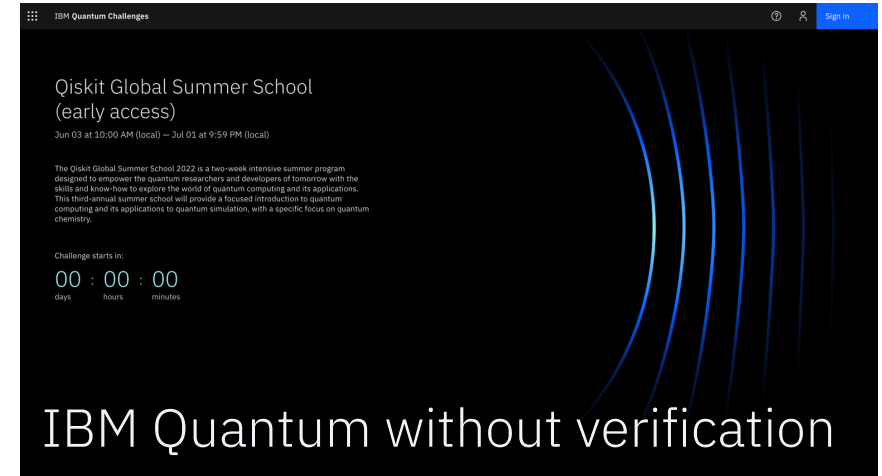
Discord will be used for all Summer School event communications, updates, study groups, lab work, Q&A, and more.

Study Groups will form and collaborate in the text/video channel places, and mentors will be able to see active groups and join to provide lab guidance and support.

CORE
Channels

#welcome
Get started here for first steps when you join the server.

#announcements
Follow this channel for all live announcements and updates.

#code-of-conduct
Review the IBM Quantum Community Code of Conduct and other guidelines - thank you for supporting an inclusive and welcoming community throughout the course!

ESSENTIAL
Features

Claim a ticket in #sandbox
Directly connect with our mentors and support for code of conduct violations or email verification issues.

!raisehand
Directly connect with our mentors and support for general questions or concerns.

As you join the Discord and Summer School...

STEP 1

[Join Discord]

STEP 2 (as needed)

[Create IBM Quantum Account]

STEP 3

[Verify Yourself]

And that's it!!!

Verification may take up to 24 hours – make sure and submit your information immediately upon joining the Discord server! Let us know in #general-support if you run into any issues or require support.

Certificates

Lab work will be assigned throughout the Summer School as Jupyter notebook exercises. The notebooks must be completed and submitted following the Summer School **no later than Wednesday, August 2 (11:59 PM EDT)** with a **cumulative average score of 75% or higher** in order to receive a **badge of Quantum Excellence**.

IMPORTANT NOTE! You have the option to submit your notebook multiple times - only the highest score will contribute to your cumulative average.

Support & Collaboration

Channels will be available that will be filled with IBMers and mentors to answer questions throughout the weekdays of the Summer School course. Students are also strongly recommended to set up or join a "study group" to foster group-work and building connections throughout the school.

Labs will not be reviewed during the lecture(s), so take the time to sit down and review your work. For the best experience, work with your study group to view lab session content & application exercise.

Pass/Fail Certification

You cannot reduce your score by submitting multiple times - only the highest score is kept. All lab work exercises must be completed and received no later than 11:59 PM EDT on Wednesday, August 2.

Students must achieve cumulative/average 75% across notebook submissions to get a badge of Quantum Excellence.

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IBM Quantum Community Code of Conduct

In our collective mission to continue to promote and encourage an inclusive and welcoming global quantum community, the IBM Quantum Community Code of Conduct is available for download and review here.

We appreciate everyone's support in this mission and ask that any observed code of conduct violations or inappropriate behavior are reported here.

[Read Code of Conduct]

Live Moderation & Incident Reporting

In Discord, you can also submit anonymous Code of Conduct violations or offensive/inappropriate content using this command in any channel:

Claim a ticket in #Create-a-ticket

This will send a report to the admins. It will also display a confirmation message that the report was sent which will be visible only to you in tickets.

**Make sure to include a link to the reported message (Select the message you are reporting and "Copy Message Link) for admins to review.

FAQ

Will the lectures and labs be recorded? Is live-participation required?

Yes, all lectures, labs, and Q&As will be recorded! You can join live or watch the content on-demand.

Will the Summer School content be available later in the year?

As in past years, all Summer School content and materials will be re-packaged and provided as a textbook module in the Qiskit Textbook to use in classrooms even after the Summer School concludes.

How many students are in the Summer School?

There are 6k students at the Qiskit Global Summer School.

Can my friend/student/colleague be added to the Summer School or Discord?

No, the QGSS '23 server is for registered participants.

Can I download/share this content?

Not yet - the team will share all of this (and more!) as an update to the Qiskit Textbook later this year.

IMPORTANT!

Please make sure and use Google Chrome

for headache-free course access.

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We are here to help! Please follow these guidelines to ensure the most timely and efficient support, and don't hesitate to ask any questions!

- Reach out in designated channel(s)
- Allow 1 business day for support
- Avoid multiple requests/spam
- Avoid Direct Message or emails
- Avoid submitting same request in multiple locations

Discord
#general-support

For any general support questions or support requests.

E-mail
qiskit.events@us.ibm.com

Requests involving personal or sensitive information may have longer reply times.

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Let's Get Started!

1 [Join the Discord](#)

2 [Verify Yourself](#)

3 [Join Kickoff](#)

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