Brookhaven National Laboratory

managed by Brookhaven Science Associates
for the U.S. Department of Energy

Introduction to Quantum Information Science and Engineering

for High School and Undergraduate Students

2025 Virtual Summer School
July 28 - 31, 2025

The Virginia Tech Center for Quantum Information Science and Engineering (VTQ) and the Co-design Center for Quantum Advantage (C^2QA) offer a four-day virtual workshop to introduce high school and undergraduate students to the exciting world of quantum information science and engineering. Educators are welcome to apply. Program participants will explore the basic principles that underlie quantum technologies and gain an appreciation for what novel capabilities are unlocked by quantum mechanics. The workshop will be led by Sophia Economou, program founder, C^2QA principal investigator, and professor, Virginia Tech. Please visit for more information arXiv 2005.07874.

The program will be conducted by Zoom web videoconferencing. To participate, students must have access to a computer, and create a free IBM Quantum Composer account.

ELIGIBILITY

The program is open to high school and undergraduate students, and educators.

PREREQUISITES

Arithmetic and basic algebra, e.g. (-2 + 6x) = -2 (1-3x).
Familiarity with quantum mechanics, linear algebra, or programming is not needed to participate.

VIRGINIA TECH

Led by Virginia Polytechnical Institute and State University

C²QA Co-design Center for Quantum Advantage

Led by Brookhaven National Laboratory

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PROGRAM STRUCTURE & SYLLABUS

The program will run each day from Jul 28 - 31. There will be two sessions per day, and attendance at both sessions is expected.

	Monday - Thursday	
	Session #1 **10:30 a.m. – 1 p.m. ET**	**Session #2** **2 – 4 p.m. ET**
DAY 1 **Monday, July 28**	**Quantum superposition, logic gates and circuits (rules for mists and boxes)**	
DAY 2 **Tuesday, July 29**	**IBM Quantum Composer**	
DAY 3 **Wednesday, July 30**	**Quantum algorithms: Money or tiger puzzles**	
DAY 4 **Thursday, July 31**	**Quantum teleportation**	

KEY PROGRAM DATES - 2025

Feb 24	**Application period commences**	**Jul 28**	**Program commences**
May 30	**Application period concludes**	**Jul 31**	**Program concludes**
May 1 – Jun 6	**Application decisions communicated**	**Aug 31**	**Certificates conferred**
Jul 3	**Student decision deadline**		

CERTIFICATE

Upon successful completion of the program, students will receive a certificate from Virginia Tech and C²QA attesting to their skills in Introduction to Quantum Information Science and Engineering.

FEES & STIPEND & CONTINUING PROFESSIONAL EDUCATION CREDIT

Fee: No fee to apply or attend. **Stipend:** Not available. **Continuing professional education credit:** Not available.

QUESTIONS

Reach out to **C2QA-Info@BNL.gov**

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