House Communications & Technology Committee

Informational Meeting Agenda

Tuesday, August 11, 2026
12:30pm

Pennsylvania State University
Agricultural Engineering Building, Room 312
436 Shortlidge Road, State College, PA 16802

Call to Order

Roll Call

Opening Remarks

Panel 1:

- Matt Brandsema
  Associate Research Professor; Quantum & Multiphysics Department Head, Applied Research Laboratory at Penn State

Panel 2:

- Jen Gilburg
  Deputy Secretary for Technology and Entrepreneurship, PA Department of Community & Economic Development

Panel 3:

- Paul Stimers
  Executive Director, Quantum Industry Coalition

- Mihir Bhaskar
  SVP, Global R&D; IonQ

Closing Remarks

Adjournment

PennState
Applied Research Laboratory

THE CYBERSECURITY IMPLICATIONS OF QUANTUM TECHNOLOGIES

A High-Level Overview

Matthew J. Brandsema, Ph.D.

Associate Research Professor

Quantum & Multiphysics | Department Head

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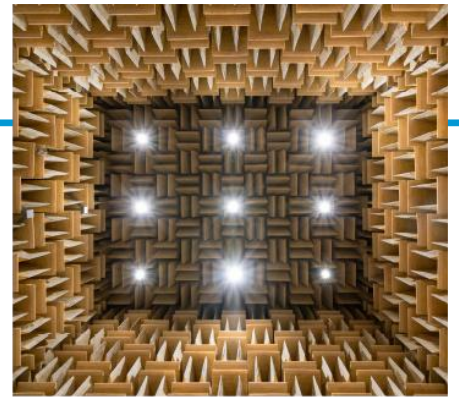
Penn State ARL

- Designated University Affiliated Research Center (UARC), serving as a center of research excellence for national security applications
- ~1700 employees including ~200 students
- Contribute to the education, research, and land-grant mission of The Pennsylvania State University
- Annual Research Expenditures of $417 million (UFY25)
- Providing cost-effective, innovative, and independent technical expertise in support of national security objectives



The Potential of Quantum Technologies

- Quantum technologies matter economically because they could create entirely new capabilities in computing, sensing, communication, and security, which in turn could improve productivity, reduce risk, and enable new markets.

Quantum Computing

- Faster and more efficient solutions for certain hard problems
- Better simulation of molecules and materials
- Improved optimization in logistics, finance, manufacturing, and scheduling

Quantum Sensing

- More precise measurement of time, gravity, acceleration, magnetic fields, and rotation
- Better navigation in GPS-denied environments
- Improved medical imaging and diagnostic techniques
- Better detection of underground structures, defects, or hidden objects

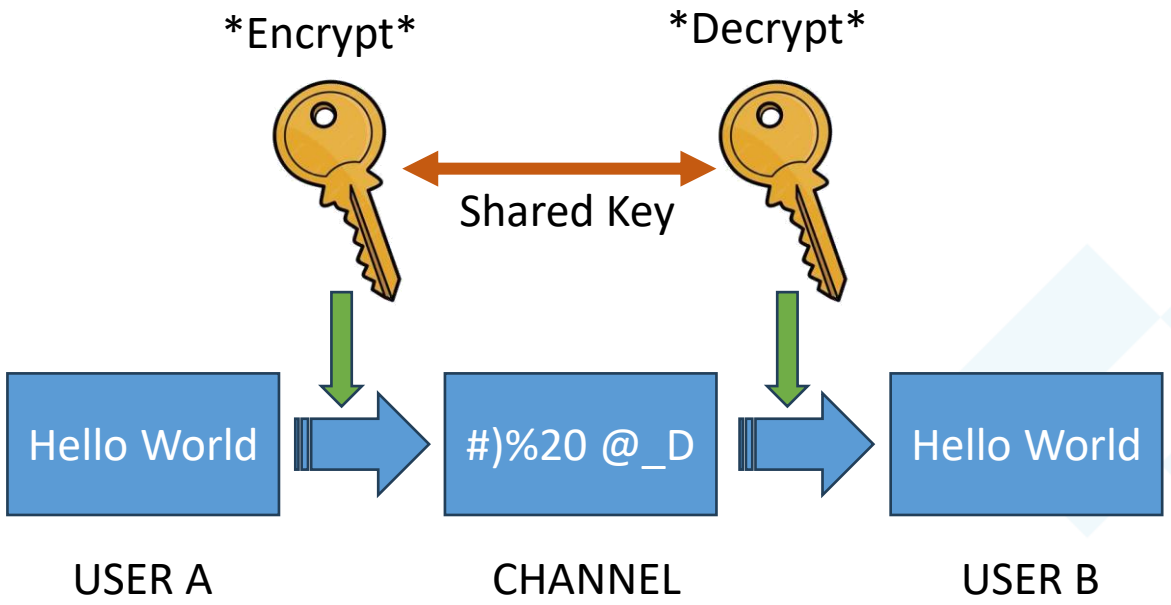
Quantum Communications

- New ways to distribute cryptographic keys securely
- Stronger protection for certain high-security networks
- Potential for ultra-secure government, defense, and critical infrastructure communications

What is Encryption?

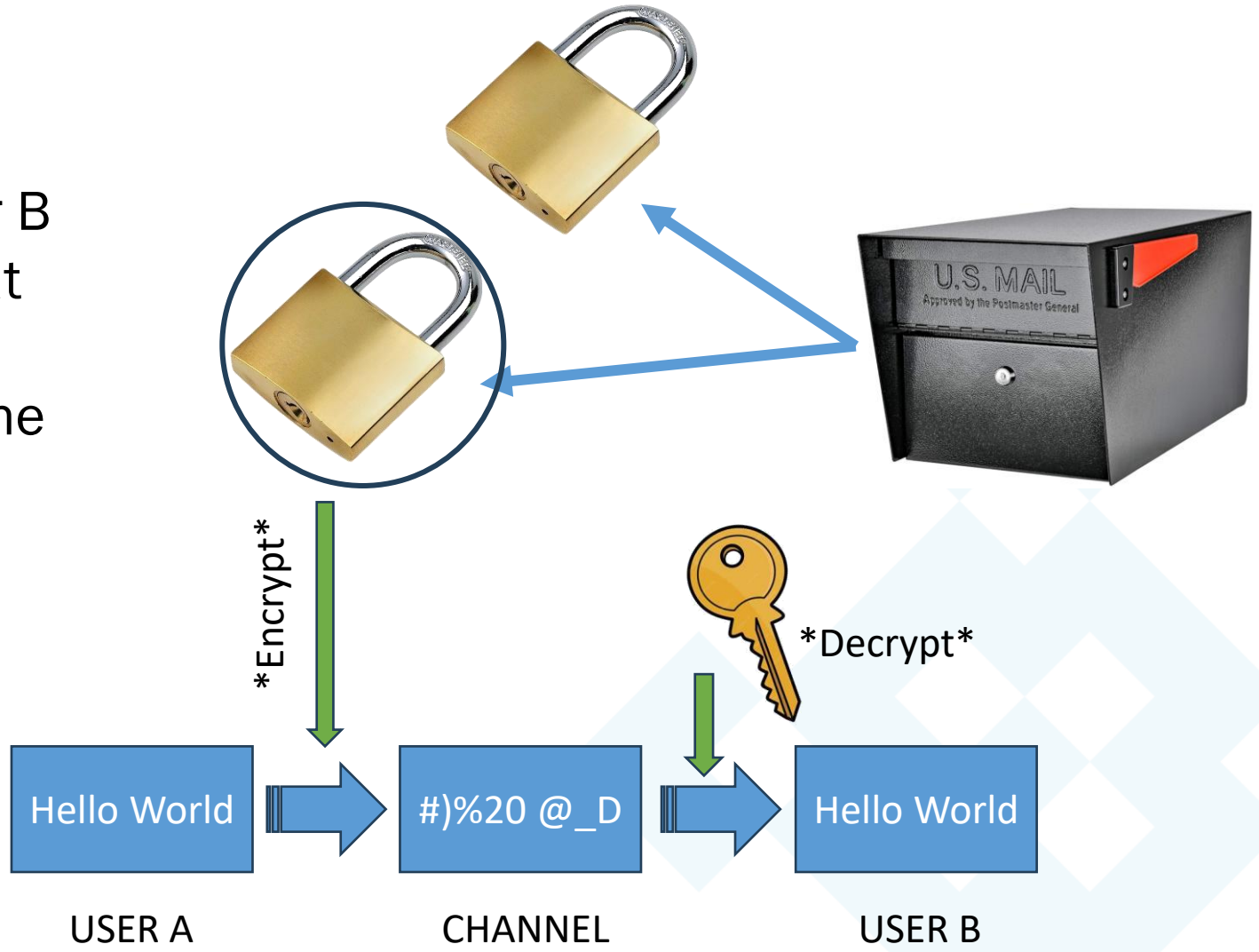
- Encryption converts the message into a form that looks like nonsense unless you have the secret key to read it.

- Encryption protects privacy, prevents tampering and helps us trust the internet (banking, messaging, logging in, downloading software, etc.).



What kind of Cryptography is at Risk?

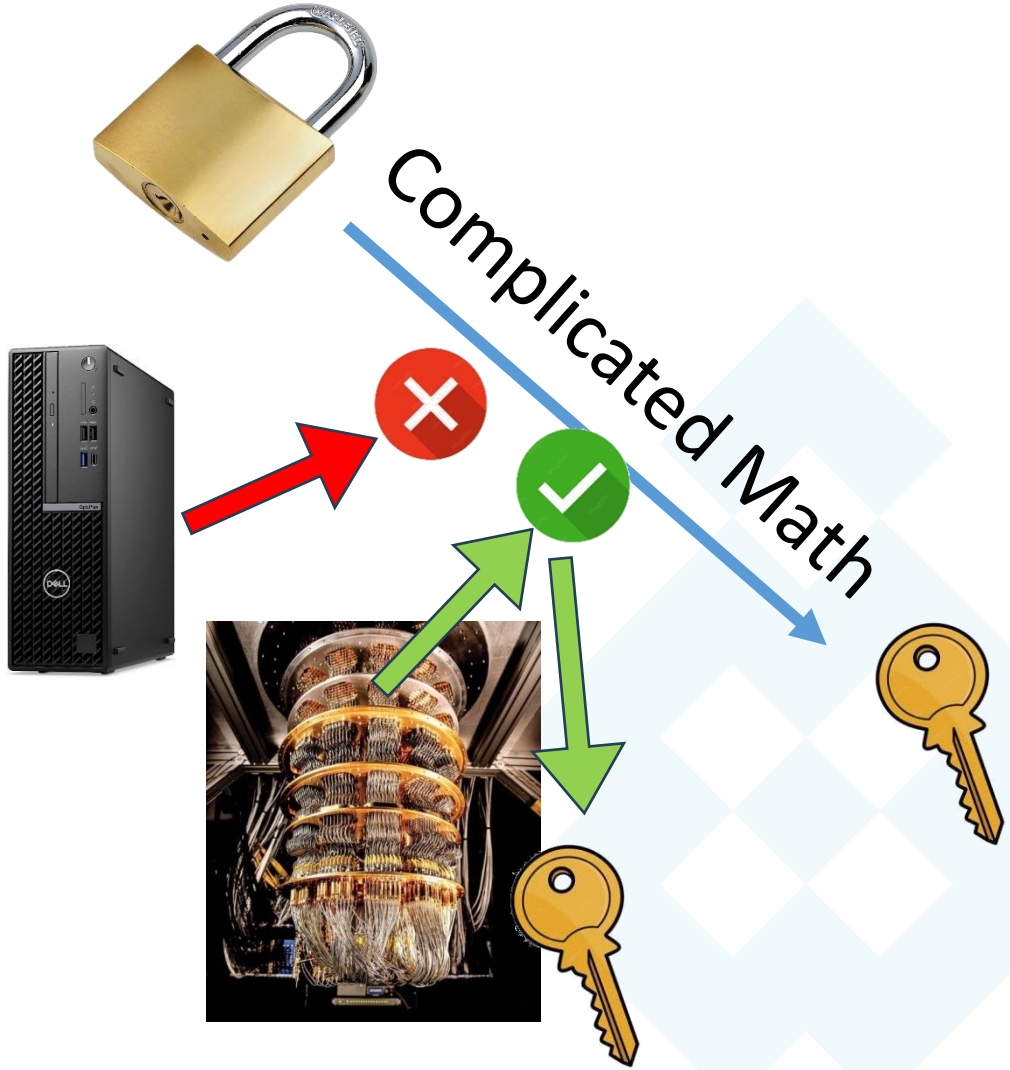
- In public-key cryptography, User B gives everyone a public lock that can be used to secure a message, but only User B has the private key that can open it.
- This is a metaphor to help understand is not perfect.



Why Quantum Computers pose a Threat

- The security comes from the fact that it's easy to use the public key to encrypt, but extremely hard for a classical computer to figure out the private key from the public one.

- **This is the kind of hard math that quantum computers can attack much more efficiently.**



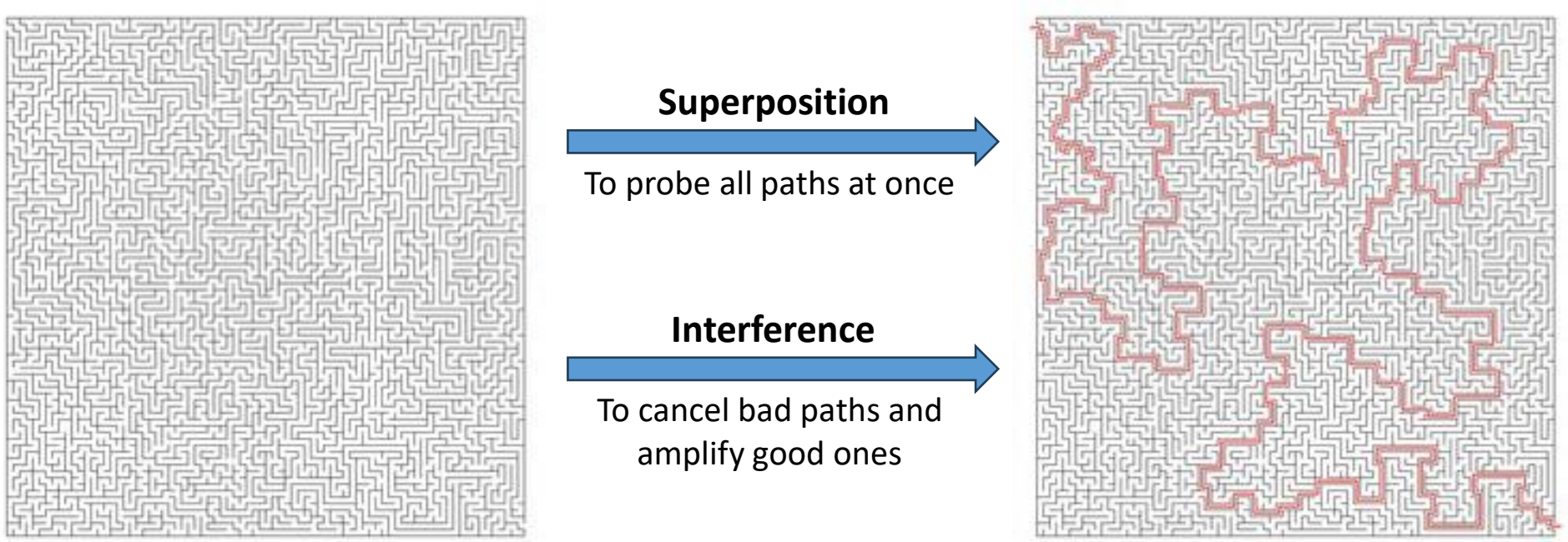
Where is this Type of Cryptography Used in the Real World?

- **Used for:**
  - Digital Signatures
  - Banking
  - Authentication
  - Sensitive Information (government, healthcare, IP, legal records, industrial data, etc.)
- **This allows a bad actor with a quantum computer to:**
  - Forge digital signatures
  - Derive private keys from public keys
  - Impersonate systems
  - Decrypt data that was recorded earlier (Harvest now, decrypt later)

What makes a Quantum Computer Different?

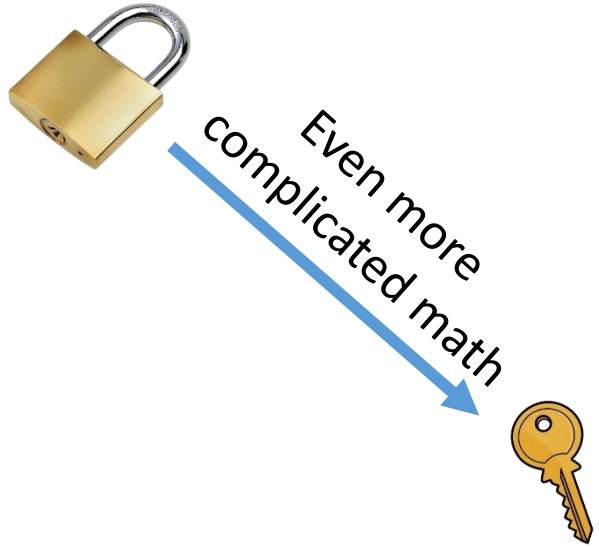
- A quantum computer uses superposition to explore many possibilities at once, and interference to make the correct answer more likely than the wrong ones.

- This is very useful for breaking public-key cryptosystems!



The Post-Quantum Era

- The post-quantum era is the period where we assume large quantum computers exist and can break today's public key cryptography.
- Public key crypto must be replaced
- The internet's trust system must migrate!
- SOLUTION: Make the math even more complicated such that it is also hard for a quantum computer.



Testimony on Quantum Technology before the House Communications and Technology Committee

Pennsylvania Department of Community and Economic Development

August 11, 2026

Good afternoon, Chairman and members of the Committee, thank you for the opportunity to discuss quantum computing and what it means for the Commonwealth of Pennsylvania. My name is Jen Gilburg, and I am the Deputy Secretary of Technology and Entrepreneurship for DCED.

Artificial intelligence is transforming how we work today. Quantum computing will transform what is possible tomorrow.

While quantum technology is still emerging, its impact will be profound. It has the potential to revolutionize drug discovery, advanced manufacturing, energy, agriculture, financial services, logistics, and national security by solving problems that today's most powerful computers simply cannot.

The question is not whether quantum computing will reshape our economy — it will. The question is whether Pennsylvania will help lead that transformation.

I believe we can because we already have the foundation.

Pennsylvania is home to seven R1 research universities, world-class expertise in artificial intelligence, robotics, cybersecurity, semiconductors, advanced manufacturing, and one of the most diverse industrial economies in the nation.

That is exactly why the Commonwealth helped launch the Keystone AI + Quantum Factory – a first-of-its-kind statewide partnership bringing together Pennsylvania's seven R1 research universities, the Pittsburgh Supercomputing Center, Team Pennsylvania, industry partners, and the Commonwealth. Rather than competing institution by institution, we are creating a single innovation ecosystem that combines shared computing infrastructure, collaborative research, workforce development, and commercialization. Our objective is simple: ensure that the next generation of AI and quantum technologies creates companies, investment, and jobs here in Pennsylvania.

With the passage of the 2026-27 Budget, Innovate in PA 2.0 established $125M for early-stage startups across robotics, life sciences, energy, agriculture, and advanced manufacturing. This crucial investment will strengthen Pennsylvania's status as a national leader in biotech and innovation, continue to attract & retain high-growth companies, and ultimately, connect Pennsylvanians to high-paying jobs in these emerging industries.

As we continue building that ecosystem, I believe there are three priorities.

First, security.

Quantum computing will fundamentally change cybersecurity.

The encryption that protects our financial systems, healthcare records, critical infrastructure, defense systems, and government communications will eventually need to transition to post-quantum standards. That transition will take years, and organizations that begin preparing now will be far better positioned than those that wait.

Pennsylvania has an opportunity not only to secure our own digital infrastructure, but also to become a national leader in developing and deploying the next generation of cybersecurity technologies.

Second, workforce.

Quantum computing will create an entirely new generation of high-paying jobs.

Certainly, we will need researchers and quantum scientists. But we will also need quantum software developers, cybersecurity specialists, semiconductor engineers, photonics experts, advanced manufacturing technicians, precision machinists, cryogenic systems technicians, and skilled trades that build and maintain these sophisticated facilities.

Many of these careers will not require a Ph.D. They will require technical training, certifications, apprenticeships, associate degrees, and industry partnerships.

That is why workforce preparation must begin today.

Our community colleges, career and technical education centers, regional universities, and our seven R1 institutions each have an important role to play in preparing Pennsylvanians for these emerging careers.

And third, collaboration.

No single university, company, or state agency can build a quantum economy alone.

Pennsylvania's greatest competitive advantage is our ability to work together.

Through the Keystone AI + Quantum Factory, our research universities are collaborating instead of competing, creating a statewide platform that can attract federal investment, accelerate commercialization, and give companies a single front door to engage with Pennsylvania's research and innovation ecosystem.

When combined with our manufacturers, workforce organizations, regional universities, community colleges, and private industry, our Commonwealth has the opportunity to build one of the nation's premier AI and quantum ecosystems.

Quantum computing is not simply about faster computers.

It is about strengthening Pennsylvania's competitiveness across manufacturing, life sciences, agriculture, energy, robotics and technology, and countless other industries that drive our economy.

Our goal is straightforward: that the technologies invented in Pennsylvania are commercialized in Pennsylvania, manufactured in Pennsylvania, and create careers for Pennsylvanians.

By continuing to invest in research, workforce development, cybersecurity, and the Keystone AI + Quantum Factory, I believe Pennsylvania can become a national leader in the quantum economy.

Thank you for inviting me to testify before your committee. I look forward to any questions and look forward to partnering together in the future to maintain Pennsylvania as a national leader in this space.

TESTIMONY OF PAUL STIMERS

Executive Director, Quantum Industry Coalition

Before the Pennsylvania House of Representatives

Communications and Technology Committee

August 11, 2026

Chairman Ciresi, Republican Chairman Ortitay, and distinguished members of the Committee, thank you for the opportunity to testify today on behalf of the Quantum Industry Coalition. My name is Paul Stimers, and I serve as Executive Director of the Coalition. Our membership spans the full spectrum of quantum hardware, software, and applications, and our companies range from start-ups to Fortune 100 enterprises. Our goal is to maintain and enhance United States leadership in the development and commercialization of quantum technologies.

Quantum computing represents one of the most consequential technological advances of our era, with the potential to bring transformative economic, scientific, and national security impacts. To appreciate what makes quantum computing fundamentally different from the computers we use today, consider that a classical computer processes information as bits, each of which is either a zero or a one at any given moment. A quantum computer, by contrast, uses quantum bits, or qubits, which exist in what physicists call superposition: a state that is simultaneously zero, one, and every value in between. Qubits can become entangled with one another, meaning the state of one qubit is intrinsically linked to the state of another regardless of physical distance. These two properties allow a quantum computer to explore vast numbers of possibilities simultaneously rather than sequentially, enabling it to solve certain classes of problems that are impossible for even the most powerful classical supercomputers.

Quantum computers are not merely faster versions of classical computers – they do not simply extend Moore's law. Instead, they unlock the ability to solve problems that classical computers cannot. Quantum computers show extraordinary promise for discovering and designing advanced materials capable of withstanding extreme conditions, such as those required for next-generation energy systems. They can optimize enormously complex systems, from logistics and supply chains to electric grids, where the number of variables overwhelms classical approaches. They can model physical, chemical, and financial systems with a fidelity far beyond what classical computation can achieve. Industry roadmaps predict that quantum computers may accomplish major milestones in each of these areas by the end of this decade, and a variety of quantum architectures have already begun to demonstrate utility in real-world contexts. The implications for the economy and national security are enormous.

The competitive landscape demands urgency. The United States is in a quantum technology race. China and other international competitors are investing heavily in quantum research, workforce, and infrastructure, and if we fall behind, we risk losing not only economic benefits but also national security advantages and global technological leadership. States that act now to create supportive environments for quantum innovation will attract the companies, talent, and investment that will define this industry for decades.

Although Pennsylvania is not currently considered one of the nation's leaders in quantum computing research, development, and commercialization, it has the potential to capture significant economic benefit from the quantum revolution. The Commonwealth possesses world-class research universities with established programs in physics, engineering, and computer science. It has a deep manufacturing base with expertise in precision components, advanced materials, and cryogenic systems. It is home to critical energy infrastructure and a skilled technical workforce. These assets align directly with the needs of the growing quantum industry, which requires not only theoretical researchers but also engineers, technicians, and manufacturing workers who can build, maintain, and operate quantum systems at scale.

Pennsylvania's opportunity to compete in this emerging industry can usefully be understood in three parts: attracting quantum companies to locate and grow within the Commonwealth, promoting Pennsylvania businesses that can become suppliers to the quantum computing market, and developing the specialized workforce that quantum technologies require. Success in each of these areas reinforces the others, and I would encourage the Committee to consider its policy options within this framework.

First, to attract quantum companies, Pennsylvania should consider offering targeted incentives for quantum research and development and manufacturing facilities to locate and expand within the Commonwealth, streamline permitting and site-readiness programs for advanced manufacturing operations such as chip fabrication, photonics, and cryogenic systems production, and actively promote Pennsylvania's research universities, manufacturing base, and energy infrastructure to quantum companies evaluating where to grow. Public-private partnerships and regional innovation hubs, connecting universities and private industry can help anchor this effort and give Pennsylvania a distinct competitive identity in the quantum industry.

Second, Pennsylvania can take steps to become a leader in the domestic quantum supply chain. As quantum computing transitions from laboratory prototypes toward datacenter-scale systems, the industry requires world-class manufacturing capabilities for specialized chips, photonic components, cryogenic systems, lasers, and connectivity solutions. Today, many of these components are produced only in very low volumes worldwide, creating both a challenge and an opportunity for states that move decisively to attract quantum manufacturing. Pennsylvania should consider incentivizing quantum R&D and manufacturing facilities, creating public-private partnerships modeled on the regional innovation hubs that have proven effective elsewhere, and positioning its universities and research institutions as anchors of a quantum ecosystem. The Pennsylvania network of Manufacturing Extension Partnership Centers – IMC, Catalyst Connection, and the rest – is a valuable resource.

Third, to develop the quantum workforce, Pennsylvania should consider investing in education pipelines that extend from secondary school through university and into industry; support community college and technical training pathways for quantum-related manufacturing and technician roles; and incentivize partnerships between Pennsylvania universities and quantum companies for internships, cooperative education, and applied research. A skilled, homegrown workforce is what will ultimately allow Pennsylvania to sustain both the companies it attracts and the customers it develops. My members have focused intently on domestic quantum workforce development since our founding in 2017, and we strongly believe it is essential to long-term competitiveness.

I must also bring to the Committee's attention a matter of immediate concern for Pennsylvania's government IT systems: cybersecurity in the quantum era. A sufficiently advanced quantum computer could break most of the cryptographic systems currently protecting sensitive government data, financial transactions, personal information, and critical infrastructure communications. While such a computer may still be some years away, the threat is not a future problem alone. Adversaries, including nation-state actors, are already harvesting sensitive encrypted information today and storing it with the expectation of decrypting it once a capable quantum computer becomes available. This strategy, known as “harvest now, decrypt later,” means that data encrypted today with current methods may already be compromised in a practical sense if it will remain sensitive for a few more years.

The National Institute of Standards and Technology has led the effort to develop quantum-resistant cryptographic algorithms for nearly a decade and approved the first set of post-quantum cryptographic standards in October 2025. A federal executive order has tasked agencies with accelerating the transition, requiring high-value assets and high-impact systems to use post-quantum cryptography by the end of 2031 and directing updates to federal acquisition rules requiring contractor compliance by the end of 2030. The ecosystem of companies delivering these new algorithms has matured to the point where transition is possible now for some high-risk systems, particularly at the network layer.

Pennsylvania government agencies handling sensitive data should already be actively preparing for this transition. The Coalition recommends that agencies begin with education and awareness, followed by comprehensive cryptographic inventories to identify where vulnerable encryption is deployed, risk assessments to prioritize systems based on data sensitivity and longevity, and the development of transition strategies and pilot programs for migrating high-risk systems to validated post-quantum cryptographic solutions. Government agencies should take advantage of this opportunity to move to crypto-agility, which will enable IT systems to respond more rapidly to rapidly-evolving, AI-enabled threats.

The quantum era is arriving. Pennsylvania has the assets, the talent, and the institutional strengths to be a national leader in this transformative technology. What is needed now is the policy vision and commitment to match those strengths. The Quantum Industry Coalition and its members would be pleased to serve as a resource to this Committee and the General Assembly as you consider these important questions. Thank you for your attention, and I welcome your questions.

Written Testimony of IonQ SVP of Global R&D, Mihir Bhaskar
Pennsylvania General Assembly House Communications and Technology Committee
Tuesday, August 11, 2026

Chairman Ciresi, Chairman Ortitay, Vice Chairs Nelson and Day, and members of the Committee, I am Dr. Mihir Bhaskar, Senior Vice President of Global Research & Development at IonQ, a leading quantum technology company. Thank you for the opportunity to appear before you to discuss the future of quantum technologies and their implications for our economy and workforce.

I have over a decade of experience in quantum technologies and led the first demonstration of memory-enhanced quantum communication during my doctoral research at Harvard University. Before joining IonQ, I founded Lightsynq Technologies to commercialize memory-enhanced quantum interconnects and enable fast, scalable connections between quantum computers.

Founded in 2015, IonQ began as a company focused on trapped ion quantum computers. We have since expanded to developing a full-stack technology platform combining quantum computing, networking, sensing, security, and manufacturing that is designed to help enable customers across government, academia, and industry to solve problems beyond the reach of conventional computing. We believe this positions us to build infrastructure that can underpin the next generation of scientific discovery, economic growth, secure communications, and cybersecurity.

IonQ appreciates the opportunity to provide testimony on how quantum technology will transform industries, create high-skilled jobs, and strengthen critical infrastructure. This opportunity requires more than building powerful quantum computers. It depends on commercializing practical applications that solve real-world challenges, investing in the workforce and supply chains needed to deploy these technologies at scale, and ensuring industry and all levels of government are prepared for the transition to post-quantum security. It also requires an understanding of the economic and societal implications that will come with such a dramatic leap in computing power and technology.

Achieving Quantum Applications Across Multiple Industries

IonQ works directly with customers across industries to develop quantum applications that improve productivity, address real operational challenges, and accelerate innovation and scientific discovery:

- In engineering, IonQ partnered with Synopsys to demonstrate computer-aided engineering workloads. We achieved double-digit percentage advantage in end-to-end time for large-scale models such as a Rolls-Royce jet engine and automotive models.

- In logistics, IonQ is working with Einride to optimize shipment allocations and fleet orchestration for electric and autonomous freight, delivering measurable gains in real-world logistics efficiency.

- In healthcare, IonQ is collaborating with participants from the Wellcome Leap initiative in the UK to apply our quantum optimization to improve cancer research. Our work introduces new computational approaches for reconstructing difficult regions of DNA that could also become a useful foundation for future studies of genetic changes.

- In energy, a partnership between IonQ, Oak Ridge National Laboratory, and the U.S. Department of Energy demonstrated that a hybrid quantum-classical computing approach can drive power grid efficiencies and meet electricity demand at minimal cost.

These examples highlight how quantum computing is already becoming a practical tool in multiple sectors for solving problems that are difficult or impossible for conventional computing alone.

Creating High-Value Jobs and Growing the Quantum Workforce

Pennsylvania is particularly well positioned to benefit from quantum technologies because many of the Commonwealth's core industries align closely with the sectors where quantum applications are emerging first. As technologies mature, Pennsylvania companies will leverage quantum computing to accelerate product design, optimize manufacturing and supply chains, improve energy system performance, and accelerate biomedical research and innovation. Building the Commonwealth's quantum ecosystem and workforce today would help ensure these technologies—and the companies and jobs they create—take root in Pennsylvania.

Pennsylvania already has many of the assets needed to compete in the quantum economy, including the newly launched Keystone AI + Quantum Factory. Many of the skills required to support quantum—including software engineering, cybersecurity, photonics, advanced manufacturing, and artificial intelligence—are already in demand, making quantum workforce development a natural extension of existing technology and economic development priorities.

The Commonwealth's research universities, advanced manufacturing base, and skilled workforce have long driven innovation across multiple industries. The opportunity now is to translate more of that research into companies, manufacturing capacity, and high-paying jobs that remain in Pennsylvania. By building on these strengths and fostering stronger partnerships among academia, industry, and workforce development organizations, Pennsylvania can prepare students and workers for careers in quantum while ensuring employers have access to the talent needed to commercialize next-generation technologies.

Several states have already begun building these ecosystems. Illinois launched the Illinois Quantum & Microelectronics Park to co-locate research, workforce training, and

commercialization alongside national laboratories, universities, and industry partners. Colorado's Elevate Quantum initiative brings together universities, federal laboratories, and private companies to develop structured education, training, and apprenticeship pathways. And in Maryland, where IonQ is headquartered in College Park, the state's $1 billion Capital of Quantum initiative similarly unites government, the University of Maryland, IonQ, and industry partners to expand quantum research, strengthen educational pathways, develop the workforce, and accelerate commercialization through shared facilities and public-private collaboration.

Advancing Security and Sensing Through a Quantum Platform

Quantum technologies present both an extraordinary opportunity and an urgent challenge for strengthening national security and critical infrastructure. As quantum capabilities continue to advance, governments and operators must prepare for the transition to quantum-resistant cryptographic standards while also investing in more resilient critical infrastructure today. For example, water and wastewater utility companies in at least seven states have recently reported cyberattacks, some of which disrupted operations.

IonQ is helping address these challenges by advancing quantum networking technologies through collaborations with government partners. In partnership with the U.S. Air Force Research Laboratory (AFRL), IonQ demonstrated a field-deployable system capable of securely connecting separate quantum systems—advancing the technologies needed to build scalable quantum networks. IonQ also is leading one of the projects selected under DARPA's Heterogeneous Architectures for Quantum (HARQ) program to develop quantum interconnects capable of linking different types of quantum computers, which aims to help estab the networking technologies needed for future distributed quantum computing systems.

Beyond secure communications, quantum technologies also have the potential to transform civilian and military capabilities through upgraded position, navigation, and timing devices. While we all use GPS-dependent devices and services every day, it is all too often taken for granted. GPS is a key linchpin of our economic and national security, and secure, resilient alternatives and backup systems are critically important in maintaining those services. IonQ fields quantum sensors in every domain: on land, at sea, in air, and in space, with the goal of eventually upgrading the positioning accuracy of GPS systems while enabling resilience in GPS-denied environments.

Together, these efforts illustrate how a full-stack quantum platform can strengthen secure communications, improve the resilience of critical infrastructure, and support the broader transition to a quantum-enabled future. We are proud to work alongside the public sector to help ensure the United States remains a leader in secure quantum technologies.

Conclusion

Quantum technology is becoming a foundational capability for advanced manufacturing, healthcare, energy, communications, and national security. States that invest today in research, workforce development, manufacturing, and commercialization will be positioned to attract companies, create high-paying jobs, and strengthen long-term economic competitiveness.

Pennsylvania has many of the building blocks necessary to become a leader in this emerging industry, including world-class research institutions, a strong industrial base, and a highly skilled workforce. As other states continue making significant investments in quantum technology, talent, and commercialization, Pennsylvania has an opportunity to build on these strengths and help further America's economic competitiveness, national security, and technology leadership. IonQ looks forward to partnering with the Commonwealth to help translate Pennsylvania's research strengths into commercial innovation, high-paying jobs, and long-term economic competitiveness.

Thank you again for the opportunity to appear before you today. I look forward to any questions you might have.

Mihir Bhaskar, PhD
Senior Vice President, IonQ Global R&D
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