

Qunnect technology reimagines cybersecurity protection

Qunnect is one of the startups with optics, imaging and photonics-enabled technologies that's working with NextCorps' Luminate NY accelerator as part of its fourth cohort. Qunnect received an initial investment of \$50,000 as a non-competing regional participant, which allows them to take part in the six-month program to speed the commercialization of their technology and business. On September 30th at Finals 2021, 10 finalist teams in Luminate's fourth cohort will compete for up to \$2 million in follow-on investment. Funding for the \$25 million program is being provided through the Finger Lakes Forward Upstate Revitalization Initiative.

"Participants come to Luminate with brilliant ideas and a passion for solving perplexing problems across a diverse range of industries," said Dr. Sujatha Ramanujan, managing director of Luminate. "They graduate with the support and acumen they need to bring those ideas to life. Qunnect is just one of those companies and is well poised to transform our digital telecommunications infrastructure to one that is ultra secure and capable of extraordinary capabilities."

We caught up with Mehdi Namazi, chief strategy officer of Qunnect, to discuss how the company is enabling the Quantum Internet to protect against growing cybersecurity threats.

Tell us about your company.

Qunnect is building the next generation of telecommunications devices to enable scalable, quantum-secure networking. These technologies provide unprecedented sensitivity to eavesdropping, protecting communications networks from a growing number of cyberattacks that threaten businesses, infrastructure and governments around the globe. Our products are designed for real-world operation and deployment without the need for extreme cooling or vacuum support, and are compatible with existing telecommunications infrastructure. We are the first company in the world to commercialize a Quantum Memory, a foundational technology for future protocols and network architectures supporting the Quantum Internet. We plan to launch prototypes of our core product suite by early 2022 for pilot testing on commercial telecom fiber beds connecting NYC to Long Island.

Where is your company headquartered?

We are headquartered in the Brooklyn Navy Yards, Brooklyn, N.Y.

Who are the company's founders/co-founders?

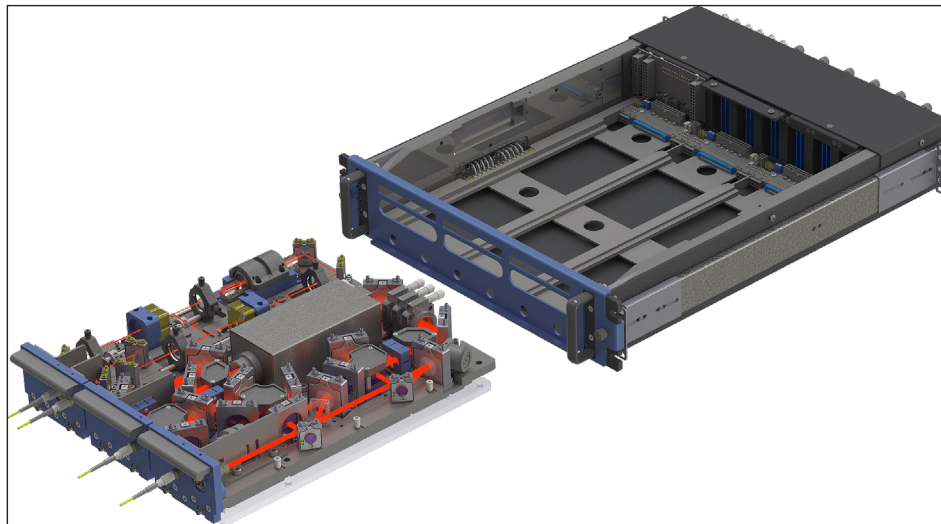


Photo provided

Qunnect is premiering Quantum Memory, a foundational technology that will support Quantum Internet to aid in preventing cybersecurity breaches.

Qunnect was cofounded by Mael Flament, our chief technology officer; Eden Figueroa, senior adviser; Robert Brill, chairman; and myself as chief strategy officer. Noel Goddard, our CEO, joined the company in January 2020.

How did you and your team develop the concept for your product?

As a Ph.D. student at Stony Brook University, I worked with Eden Figueroa. Eden had completed his postdoctoral research at the Max Planck Institute for Quantum Optics, where he worked on the topic of slowing down light. Together, we transformed this basic physics phenomenon into a method to store and release single light particles (photons) on demand, while preserving their quantum properties. More importantly, we accomplished this feat at room temperature, without the need for extreme cooling or vacuum. This became the quantum memory, which is considered a foundational technology for quantum communications.



Goddard

One cannot perform data transactions without the ability to store and release data, on demand.

Mael Flament, also a graduate student in the Figueroa Lab, took our feat to the next level, transitioning the quantum memory from a benchtop experiment into a rack-mounted instrument as part of his Master of Science degree in physics instrumentation. Together, the three of us worked with our NSF I-Corps mentor, Robert Brill, who is also a Ph.D. physicist and has had a lengthy career as an executive and investor in technology companies, to create Qunnect.

Our core product suite is called a Quantum Repeater, which consists of six devices. Two of the devices are highly unique quantum devices, which include a source that creates the encrypted light particles and a memory,

which regulates the distribution of the particles across the quantum network. The other four products support the interface of the quantum devices to each other, or the interface to a fiber network. Together these products will support the "repeating" of quantum information over long distances in the network.

Why does the world need this product?

Cybersecurity breaches are rampant, with successful attacks not only on businesses, but on defense agencies (e.g. the Solarwinds attack). Hackers can be present for months without detection, harvesting data for downstream decryption. It is time for a paradigm shift in the way we encrypt and send data. Quantum communications leverages the ability to physically encrypt data onto single light particles (photons). Any eavesdropping on the transmission of these photons results in physically changing the quantum properties, providing unprecedented speed and sensitivity to hack detection.

How long have you been working on this technology?

The company was founded in 2017 on basic research that started roughly in 2013 at Stony Brook University. We secured our first independent grant and funding in 2019, and built our Brooklyn R&D facility in July 2020.

Who is the target audience for your product?

Our first targets are defense, government and critical infrastructure researchers who are actively developing the front lines of defense against cybersecurity attacks. These early adopters will build the next generation of protocols and define standards that support quantum networks (analogous to TCP-IP protocols in the early days of the digital internet). Our second wave of customers will be telecommunications and data storage providers that



offer the secure infrastructure.

What made you look to Rochester to further your product?

Rochester is the hub of photonics manufacturing in the United States. We use a number of specialty components in our instruments and require highly skilled assembly. As our manufacturing needs grow, we hope to partner with Rochester regional suppliers and manufacturers.

Tell us about your experience being in Luminate.

Our CEO, Noel Goddard, worked with a NYC-regional state economic development initiative called Accelerate NY Seed Fund. Through that role, she had the opportunity to survey the curricula and graduates of numerous accelerator programs across the downstate region of New York. She appreciates that Luminate offers an impressively broad curriculum for early-stage technology founders looking to transition their inventions into businesses. Also, the funding that Luminate injects into these businesses at this stage plays a critical role in supporting the commercialization of the next generation of photonic technologies in the region. As evidenced by the funding record of their graduates, the program is preparing these entrepreneurs well for the next phase of their development.

What are you hoping to achieve during your time in Luminate?

With help from the Luminate network, we hope to build strategic partnerships within the regional photonics industry. If any additional funding is granted through our regional participation, it would allow us to accelerate the R&D of our product suite by expanding our team and purchasing instrumentation.

Luminate NY

The Rochester Business Journal will profile each of the Luminate finalists leading up to Finals 2021 on Sept. 30.

To receive updates from Luminate, including how to register for the free Finals 2021 event, please visit <https://luminate.org/#subscribe>.