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Luminate spotlight:

Axion Technologies is building the next generation of encryption devices

AXION TECHNOLOGIES LLC is one of 10 startups from around the world working with the Luminate NY accelerator at NextCorps in downtown Rochester. These companies are helping to write the next chapter in Rochester's history as the world's center for optics, photonics, and imaging (OPI).

Each company in Luminate's cohort 5 received an initial investment of $100,000 and is participating in the six-month program, which helps the selected companies speed the commercialization of their technologies and businesses. On October 19, at Finals 2022 at the Rochester Riverside Convention Center, they will compete for up to $2 million in follow-on investment. Funding for the $25 million program is being provided through Empire State Development's Finger Lakes Forward Upstate Revitalization Initiative.

"We couldn't be prouder of the impressive talent and hard work demonstrated by companies in our cohort 5," said Dr. Sujatha Ramanujan, managing director of Luminate. "Axion Technologies is one of those companies, leveraging innovative thinking and optics technology to create products that will enable the world to move into the next era of quantum computing with better security."

We caught up with Dr. Carol Scarlett, Founder of Axion Technologies, to discuss how the company is developing quantum random number generators (QRNG) to improve computing applications.

TELL US ABOUT YOUR COMPANY.

Axion Technologies is an early-stage hardware company designing high-speed, parallel QRNG devices for computing applications. Our initial products are developed for the High Performance Computing (HPC) industry.


Scarlett

Until now, HPC users and developers have had few options for generating random numbers, other than mathematical algorithms, which repeat or recycle numbers over time. Axion Technologies offers a new solution to serve their needs with both speed and parallelism.

In addition to high-speed, parallel QRNG, we are working to enable the use of our patented technology at a chip scale. A chip-scaled QRNG could go into numerous devices and enable improved security for the Internet of Things (IoT).

WHERE IS YOUR COMPANY HEADQUARTERED?

We are headquartered in Tallahassee, FL. I also spend significant time conducting research at the Argonne National Laboratory at the University of Chicago, a research lab for the United States Department of Energy.

WHO ARE THE COMPANY FOUNDERS?

I am the founder and CEO of Axion Technologies.

HOW DID YOU AND YOUR TEAM DEVELOP THE CONCEPT FOR YOUR PRODUCT?

Our core technology comes from a series of experiments I performed to better understand quantum optical states imprinted on a photon

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beam. During my work, I discovered a method for producing massively entangled states, leading to photonic random walking. This became the basis for the first hardware developed by Axion Technologies. We're now working to miniaturize the device to enable use of the hardware in IoT.

Axion Technologies makes products for developers of cybersecurity, AI and Data Simulations

Axion Technologies makes products for developers of cybersecurity, AI and Data Simulations. (Photo provided)

WHY DOES THE WORLD NEED THIS PRODUCT?

The coming era of quantum computing requires faster generation of random numbers to enable encryption. The exponential growth of data and tools to process information, for example AI networks, also requires generations of quality random numbers at ever increasing speeds. And, there's a need to improve data simulation used in multiple national security applications.

HOW LONG HAVE YOU BEEN WORKING ON THIS TECHNOLOGY?

I have been conducting experimentation into photonic random walking due to birefringence since 2016.

WHO IS THE TARGET AUDIENCE FOR YOUR PRODUCT?

Axion Technologies makes products for developers of cybersecurity, AI, and data simulations.

WHAT MADE YOU LOOK TO ROCHESTER TO FURTHER YOUR PRODUCT?

Rochester is home to revolutionary optics companies, like Kodak and AIM Photonics, and the SPIE optical society, offering a wealth of potential partnerships and employees.

TELL US ABOUT YOUR EXPERIENCE BEING IN LUMINATE.

Luminate has enabled my company to continue necessary R&D efforts as we seek private funding. It's also introduced us to a valuable ecosystem of potential partners and mentors.

WHAT ARE YOU HOPING TO ACHIEVE DURING YOUR TIME IN LUMINATE?

We are hoping to continue to develop our business and enable its growth. The program has already helped tremendously with strategizing toward commercial growth.