

NanoPattern Technologies revolutionizes electronics, starting with consumer devices

There's good news for anyone frustrated with remembering to charge a smart phone or watch. NanoPattern Technologies, a Chicago-based materials science startup, has created technology that enables device screens to last up to 30 days on a single charge.

The startup is one of 10 emerging companies advancing their business in the Luminate NY accelerator at NextCorps. Months away from graduating from the six-month program that offers entrepreneurial mentorship and connections to Rochester's vast network of optics experts and investors, NanoPattern has already secured interest in its optics technology from multiple manufacturers.



Yu Kambe

We caught up with Yu Kambe, CEO and co-founder of NanoPattern, to learn about the company's patented photo-patternable quantum dot ink that it is commercializing to enable tricolor microLED displays for high-resolution devices.

The high-resolution challenge

Display makers are able to make energy-efficient microLED and OLED displays for low-resolution devices, such as televisions, but it's not easy to make them higher resolution for portable devices like smartphones and wearables. The limitations are largely due to issues related to equipment costs and complexity.

In 2019, Dr. Yu Kambe, PhD (formerly founder of the Innovation and

Commercialization Fellowship Program – Institute for Molecular Engineering at The University of Chicago and a Guest Graduate Scholar at the Argonne National Laboratory), and Professor Dmitri Talapin from the University of Chicago Department of Chemistry got to work solving the problem. Their research was part of their participation in the George Schultz Innovation Fund at the Polsky Center for Entrepreneurship, in which they developed a new way of patterning functional nanoparticles with exceptional density and resolution.

They created, and since patented, chemistry and quantum dot ink that enables display manufacturers to make high-resolution screens. The company NanoPattern was established to commercialize the technology.

“Our ink product can be used by display component makers to enable manufacturing of full color microdisplays for augmented reality, virtual reality, wearables, smartphones, tablets, and televisions,” said Kambe. “The smartphones and smartwatches enabled by the new screens could last up to 30 days on a single charge, thanks to extreme energy efficiency.”

NanoPattern's initial focus is on commercializing its quantum dot ink for displays and sensors for consumer electronics applications, but Kambe said the technology can be deployed to address sustainability challenges across a wider range of industries, including manufacturing, military, and autonomous vehicles, and waveguides for 5G and 10G applications and optical fibers.

Rochester OPI community provides resources & support to enable startup's growth

Within the next 12 months, Kambe hopes to enter into an active joint development partnership with a display maker to demonstrate a fully functional screen prototype enabled by NanoPattern technology. Luminate is helping to pave the way via its extensive network.

“Being a part of the Luminate program has given us valuable connections and support, including insights into manufacturing resources available in New York State,” said Kambe. “With the team's continued support, we hope to build relationships with contract manufacturers, complete our data rooms to aid in our fundraising efforts, hire talented technical staff from the region, and bring on capable advisors.”

Managing Director of Luminate, Dr. Sujatha Ramanujan, said, “NanoPattern is building important business acumen and has demonstrated the patterning capabilities and performance of their photo-patternable quantum dot ink for high-resolution displays. We look forward to the game-changing advancements their work will bring to numerous industries that depend on optics technology.”

NanoPattern and other startups in the Luminate accelerator program will compete for up to \$2 million in follow-on funding. If NanoPattern is awarded the funding, Kambe said the team will use it to grow its technical execution staff and engage with potential customers.