

Metahelios reinvents camera chip manufacturing with next-gen color filter tech

■ SPECIAL TO THE RBJ

On the back of that small rectangular device you carry everywhere, the one you use to text, scroll, snap photos and stream videos, sits some of the most advanced cameras ever put in consumer hands. Over the past two decades, those tiny lenses have multiplied and improved, evolving from a single grainy sensor into sophisticated arrays that can capture portraits, night scenes, and even augmented reality.

But despite all this progress, every smartphone camera still depends on a decades-old technology: the Bayer color filter. Originally designed in the 1970s, it remains the backbone of image sensors. However, it also blocks more than half of incoming light and forces manufacturers to use a slow, fragmented production process. As cameras shift from capturing snapshots to powering AI-driven platforms such as facial recognition, drone navigation, and self-driving cars, this outdated filter has become a major roadblock to innovation.

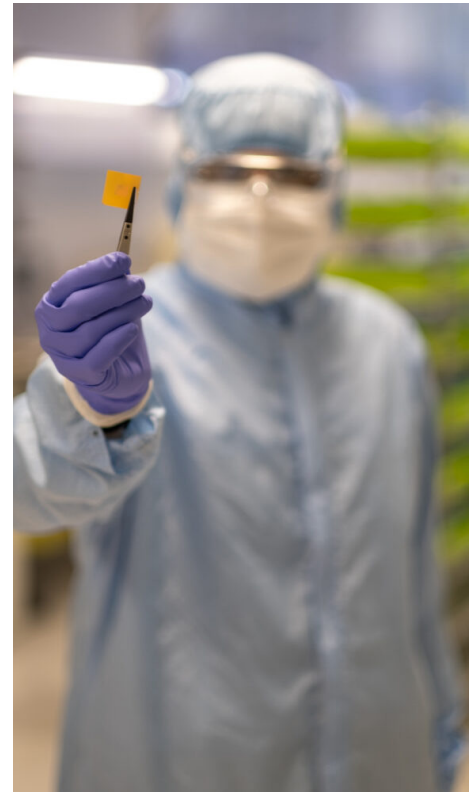
Metahelios, a startup based in Glasgow, Scotland, has devel-

oped a way around this obstacle by completely reimagining how camera chips are made. Its patented metafilter technology merges color filter functionality and advanced pixel architecture into a single, unified semiconductor process, eliminating inefficiencies while dramatically improving performance.

BREAKING AWAY FROM DECADES-OLD CONSTRAINT

Dr. Charles Altuzarra, CEO and co-founder of Metahelios, said the need for change was clear. “The Bayer filter has served the industry well, but it’s reached the point where it’s holding back both performance and scale,” he explained.

Instead of blocking light, Metahelios’ metafilter technology is designed to capture more of it. By streamlining the manufacturing workflow into a seamless semiconductor process, the company eliminates the interruptions and costly post-processing steps associated with traditional camera chip fabrication. The result is a system that can reduce industry costs by up to \$1 billion an-



Metahelios CTO, Yash Shah, holding up a metafilter chip. (Photo provided by Metahelios)

nually while giving consumers sharper, higher-quality images.

“By combining the two core elements into one semiconductor process, we’re reinventing the performance capabilities of the products to come, as well as optimizing how the products are made,” Altuzarra said. “That’s what makes this a historic, foundational leap for the entire industry.”

**LAUNCHING WITH
SMARTPHONES, EXPANDING
ACROSS INDUSTRIES**

Metahelios is initially targeting the smartphone market, where demand is both massive and fast-moving. With roughly 1.6 billion smartphones sold each year—most containing four or more cameras—the smartphone color filter segment alone represents over \$1 billion in annual revenue.

But the company's opportunity extends far beyond consumer devices. Cameras are increasingly embedded in industrial, automotive, and security systems, where they serve as sensors rather than photography tools. In vehicles, for example, improved light capture and faster processing could enhance driver assistance systems and self-driving capabilities. In security applications, better image fidelity supports facial recognition and surveillance in low-light conditions.

Altuzarra noted that as cameras become "the eyes of AI," the need for more efficient and scalable imaging technology will only grow. "Cameras are no longer just for pictures, they are becoming central to how we interact with AI systems, how we ensure safety, and how we monitor our environment," he said.

**BUILDING MOMENTUM AND A
U.S. PRESENCE**

Though Metahelios is only two years old, the company has already made significant progress. It has participated in multiple startup accelerators, including Silicon Catalyst, NATO's DIANA program, and, most recently, the Luminate accelerator in Rochester, New York. These programs provided mentorship, market insights, and the opportunity to refine the company's technology positioning.

"Conversations with veterans of the image sensor industry have been incredibly valuable," Altuzarra said. "They've helped us better understand where our technology fits and how it can reshape the market."

Metahelios applied to Luminate not only for funding, but also to build a stronger presence in the United States and gain access to its deep manufacturing and investment networks. Through Rochester's optics, photonics, and imaging (OPI) ecosystem, the company connected with investors, legal and technical experts, and U.S. foundries that will be critical for scaling wafer-level manufacturing. "The technical, legal, and business expertise we've received in Rochester through Luminate has been outstanding," Altuzarra added. "They've given us tools that will play a strong role in our success."

NEXT STEPS FOR METAHELIOS

Over the next 6–12 months, Metahelios will focus on two key priorities: completing a seed funding round, scheduled to open in August and close by December 2025, and securing a foundry partner for its wafer-level manufacturing research and development. The company also plans to expand its team to accelerate commercialization.

If it secures follow-on funding at Luminate Finals, Metahelios intends to invest in mass manufacturing R&D with prominent U.S. foundries, laying the groundwork for large-scale adoption of its metafilter technology.

"Our technology is more than an upgrade, it is a complete reinvention of how camera chips are made," Altuzarra said. "By simplifying production while improving image quality, we're setting the stage for a new era in imaging."

The companies of Luminate cohort 8 will compete for \$2 million in follow-on funding at Luminate Finals 2025 on October 22, which is open to the public. The program is funded by Empire State Development's Finger Lakes Forward Upstate Revitalization Initiative. For more information about the Luminate accelerator and Finals 2025, visit luminate.org.