

LSI Alumni Innovator Spotlight: Illuminant Surgical's Eldrick Millares



Eldrick Millares (Source: Illuminant Surgical)

Illuminant Surgical is building a new way to see into the body during procedures by projecting patient-specific anatomy directly onto the skin. Co-Founder and Co-CEO Eldrick Millares is leading the company toward a single, ambitious mission: “X-ray vision for the body.” Starting with spine surgery, Illuminant aims to transform surgical access, making procedures faster, more accurate, and more intuitive.

One Mission: X-Ray Vision for the Body

Illuminant Surgical's story is easiest to understand through the clarity of its north star. As **Eldrick Millares** put it, “We want to be able to see into the

human body, essentially creating X-ray vision for the body.” The team is chasing that goal without adding friction to the procedure room and without asking surgeons to change how they work.

That mission shows up in the details of the platform, but it starts with a mindset. Millares has spent his career

building at the intersection of hardware and software, first in deep tech and then in medtech. “I started working on LiDAR sensors for self-driving cars,” he said, describing the early foundation that now informs Illuminant's approach to sensing, tracking, and real-time computation.

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From Stanford Dormmates to Co-Founders

Illuminant was founded by Millares and his Co-Founder and Co-CEO, **James Hu, MD**. Their relationship dates back to their freshman year at **Stanford University**, where they were dormmates, and their complementary backgrounds continue to shape the company's approach today.

Hu brings the clinician's and researcher's perspective. Trained as a bioengineer, he earned his MD from the **University of California, Irvine** while simultaneously working full time at the startup. “Imagine 80-, 90-hour work weeks where he had to drive from Orange and Irvine all the way up to our offices in Culver City,” Millares said.

Illuminant's broader team reflects that same cross-disciplinary mindset. The company intentionally recruited software talent from outside traditional medtech, pulling from graphics and video games to rethink how visualization can work in the procedure room. “We get to use amazing technology to model and create realistic 3D characters,” Millares said. “You've seen it in **Disney** and **Pixar** movies. How hair moves, how muscles move, skeletal animation. We want to bring that same technology into medicine to understand how bones move in real time, how skin and tissue behave, and ultimately achieve X-ray vision into the human body.”

Spine Surgery as the Proving Ground

Illuminant is starting with spine surgery as its initial indication because it is both high-need and high-bar. “Spine is a really forward-looking, innovative market,” Millares said. “It's complex surgery, and it can take many hours. There's a really high bar for technology

that makes it into spine surgery.”

The company also has strong clinical proximity to the problem, including advisors who are Co-Directors at the **USC Spine Center**, and a network that supports rapid iteration. For Illuminant, spine surgery is not just a beachhead; it is a proving ground where a platform has to earn the right to expand.

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Turning the Patient Into the Display

Illuminant's core bet is that image guidance becomes more intuitive when you remove the mental translation step. Traditional navigation systems often force surgeons to shift their attention between the patient and multiple screens, mentally translating 2D scans into 3D reality. Illuminant's approach is different: put the information where the work is happening.

“We're using projectors to project information directly on the patient's skin,” Millares shared. “Imagine being able to see the bones, blood vessels,

anything that can show up on a scan. We project that in a way that's spatially accurate, within millimeters of that structure in the body.”

Instead of asking a surgeon to interpret anatomy, Illuminant aims to visualize it in the operative field itself, using dynamic projection mapping that adapts in real time. “As the patient moves, we can adapt the visualization in real time so it remains accurate,” he said. “We're talking millimeter-level accuracy.” This concept is often described as anatomical projection, and for Millares, it represents a fundamental shift in how surgeons visualize and interact with anatomy during procedures. As Millares explained, “Just as laparoscopic cameras revolutionized minimally invasive surgery, anatomical projection will redefine how doctors interact with anatomy.”

Non-Invasive Registration, Built for Expansion

Accuracy is the prerequisite for trust, and Illuminant built a second core capability to make accuracy practical without invasive workflow burdens. “We've developed little stickers you can put onto the patient's back, arrange them in any pattern, and use them to align the medical image to the patient



(Source: Illuminant Surgical)



James Hu, MD (left) and Eldrick Millares (right) (Source: Illuminant Surgical)

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with sub-millimeter accuracy,” Millares said.

This matters because traditional spine navigation can require drilling a reference array into the patient’s hip bone. Illuminant’s approach is designed to be fully non-invasive, faster to set up, and easier to extend into lower-acuity procedures.

Inside the Market Opportunity

Illuminant’s initial focus is spine surgery, but the platform is designed to scale across adjacent procedural categories where image guidance can be both clinically meaningful and operationally limiting today.

Millares cited more than 1.7 million spine procedures annually in the U.S.

alone across fusions, discectomies, and laminectomies. Beyond spine, the company sees expansion into interventional radiology and pain management, where procedure volumes are even higher. “There are nearly 10 million procedures for pain management every year in the U.S.,” he said. Across spine, interventional radiology, and pain management, Illuminant Surgical estimates a \$5.6 to \$6 billion opportunity for advanced image guidance.

Progress, Proof, and What Comes Next

Illuminant is approaching a major transition point from development into formal verification and validation work. Along the way, the company has built multiple prototype systems and used them to validate performance in pre-clinical settings.

One milestone that stood out came from porcine model studies that tested accuracy in a highly constrained anatomy. “These are 40- or 50-pound pigs,” Millares said. “Their vertebrae are really small, basically the vertebrae of a small child.”

He described the test result in a way that makes the impact easy to visualize: “James placed eight screws, all right down the middle, achieving our accuracy targets,” Millares said. “If he can

do that, and he’s not a spine surgeon, when we get actual spine surgeons in for cadaver testing, it’s going to be a slam dunk.”

Beyond internal progress, Illuminant has shared its work with the spine community, including a presentation at the **Global Spine Congress** in Rio de Janeiro. “We had an amazing response from the surgeon community,” Millares said.

Looking forward, the team is preparing for the next stage of testing and regulatory submission planning. “In the next few months, we’re looking to build our V&V units, complete the canonical set of testing, and then take all that data and submit it to the FDA,” Millares said.

A Message to the Next Generation of Builders

In December 2025, Millares and Hu were named to the **Forbes 30 Under 30** list in Healthcare, and Millares used the moment to advocate for more young builders entering medtech.

“In our experience building in medical technology for the past four years, it’s clear that there aren’t enough of our peers choosing to work in this space. The classic refrain is that medtech is hard. And it is. It requires rigor in clinical testing, the ability to communicate with regulators, discipline in quality, and patience navigating reimbursement and commercialization. Not to mention the nitty-gritty of research and development and truly understanding the clinical problem. Yet, in my opinion, it’s the best thing I could ever imagine working on. Why not do the hard things to make a profound impact on human life?”

See Millares Live at LSI USA '26

Millares has been selected to present at LSI USA '26, taking place March 16th–20th in Dana Point, CA, where he will share the latest progress toward Illuminant Surgical’s vision for real-time anatomical projection in spine surgery and beyond. As the company advances into its next phase of verification, validation, and FDA preparation, LSI USA will be a key moment to showcase how Illuminant is bringing “X-ray vision for the body” closer to clinical reality. **LSI**