

TURNING POINT

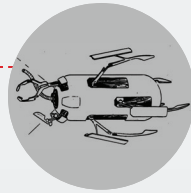
THE ROBOTICS OPPORTUNITY

What if we could use magnets to reach the deepest and most delicate parts of the human body, where no medical probe could go?

This is the challenge Pietro Valdastri, founder of Science and Technologies of Robotics in Medicine (STORM) Lab, finds himself drawn to.

FROM INSECTS TO MAGNETS

Valdastri's first foray dates back to his postdoctoral research, when working on a 12-legged capsule robot that could crawl inside the intestine to enable imaging and intervention. While this innovation received media attention, it was difficult to assemble and ran the risk of falling apart inside the body.



◀ A sketch of the 12-legged capsule robot, initially designed for colonoscopy but soon deemed unfeasible in practice. Courtesy of Virgilio Mattoli

A NEW DIRECTION

Casting aside that initial idea, Valdastri's team began developing a more practical one: a robotic endoscope that uses magnetic fields to guide the endoscope without stretching the patient's tissue.

But the team soon encountered a significant setback. The magnetic endoscope was prone to losing magnetic coupling and ended up being three times slower than a conventional colonoscopy.

The realization that the technology needed to localize the magnet in real time coincided with Valdastri's move to Vanderbilt University in 2011.

LESSONS ON RESILIENCE

When setting up STORM Lab, Valdastri learned resilience the hard way. Of around 20 grant proposals, only one was funded. "While you cannot take no as an answer, listening to feedback is just as important," says Valdastri. "Every time you get feedback, you can improve."

A PIPELINE OF INNOVATION

Since settling at the University of Leeds, STORM Lab has focused on expanding beyond a single technology.

Magnetic vine robots, for instance, mimic the movement of creeping vines and have the potential to squeeze through the deepest parts of the lungs, beyond the reach of manual catheters. In the future, they could potentially diagnose and treat other life-threatening diseases, like brain tumors, without damaging the neurons in its path.

"The dream would be to have a continuous pipeline of innovation that gets to patients," says Valdastri.

A EUREKA MOMENT

After 12 years, and a move from Vanderbilt University to the University of Leeds along the way, STORM Lab's very first innovation finally entered human trials in October 2023.

These milestone robotic colonoscopies, which Valdastri describes as his proudest moment, were made possible through industry partnerships. The loan of an ISO-certified robotic arm from a German robotics manufacturer, for example, was crucial to STORM Lab's journey from bench trials to human trials.

Business is rarely a straight line.

