
DON'T SETTLE

Sometimes you're halfway down the aisle before you realize you've made the wrong choice. That's what happened to Professor Doug Hart's team, who had courted one market for their **SINGLE-LENS 3D SCANNER** only to fall for another. So they called off the wedding and proceeded to transform the practice of dentistry.

“We just didn't feel the conviction.” Eric Paley is describing the moment in 2003 when Doug Hart, Janos Rohaly

and the rest of their team made the difficult choice to walk away from a likely source of venture funding because the target market, machine vision for industrial inspection, didn't feel right.

Hart, a professor in Mechanical Engineering, and Rohaly, a senior lecturer, had spent nearly four years creating and evolving an innovative 3D surface-imaging system based on Hart's work in fluid diagnostics, optics, and image processing. Supplanting dual-lens cameras that imaged an object from different angles, their device used a single lens with a rotating, off-axis aperture to generate 3D surface images in real time.

TECHNOLOGY IN SEARCH OF A MARKET

Paley and Micah Rosenbloom—Harvard Business School students who joined the team as part of MIT's \$50K business plan competition—had spent months exploring more than 40 potential markets for such a device. But nothing clicked. So when investors showed an interest in using the technology for industrial 3D imaging, the team entered discussions about venture funding, despite concerns that their device wasn't a good fit for that market.

Then they fell in love with a different market. It started when Paley went to the dentist. Dentistry was one of

the applications they had explored, so Paley practiced his pitch, explaining how the scanner could transform the process of making dental restorations, such as crowns and bridges.

FINDING “THE ONE”

The dentist thought the idea had merit, and soon the evidence began to mount that this market might be “the one”. For example, they got an exploratory phone call from Invisalign, the maker of invisible braces. Intrigued, they felt compelled to explore the market in a systematic way before closing a deal with their current suitors.

In a process Rosenbloom calls “going to the source,” he and Paley spent a month meeting with every expert they could corral. Paley says, “In one meeting, the Dean of the Harvard School of Dental Medicine said, in effect, ‘What you're doing is the future of dentistry, and we need to be a part of it.’” That settled it. The group turned down a funding offer that was on the table, sure they had made the right decision.

“THE WORST POSSIBLE ENVIRONMENT”

The act of choosing a market not only signaled it was time to start a company but also clarified what challenges had to be solved to commercialize the scanner. As Hart explains, “The inside of someone's mouth is the worst possible environment for imaging. It's dark. It's wet and it's shiny. The person's tongue gets in

KEY INNOVATORS

- DOUGLAS P. HART, Professor of Mechanical Engineering; Principal Investigator in the Hatsopoulos Microfluids Laboratory at MIT; co-founder of Brontes Technologies
- JANOS ROHALY, Ph.D., co-founder and former Chief Scientist of Brontes Technologies
- FEDERICO FRIGERIO, Ph.D., co-founder of Brontes Technologies

SAY “AHHHHH!” 3M’s True Definition Scanner is a second-generation commercialized version of Hart and Rohaly’s invention. Using a handheld wand that resembles an electric toothbrush, a dentist “paints” the patient’s teeth with pulsing blue light, rendering a precise, 3D model on a video screen. The digital data is then used to drive various steps in making crowns, bridges and braces.

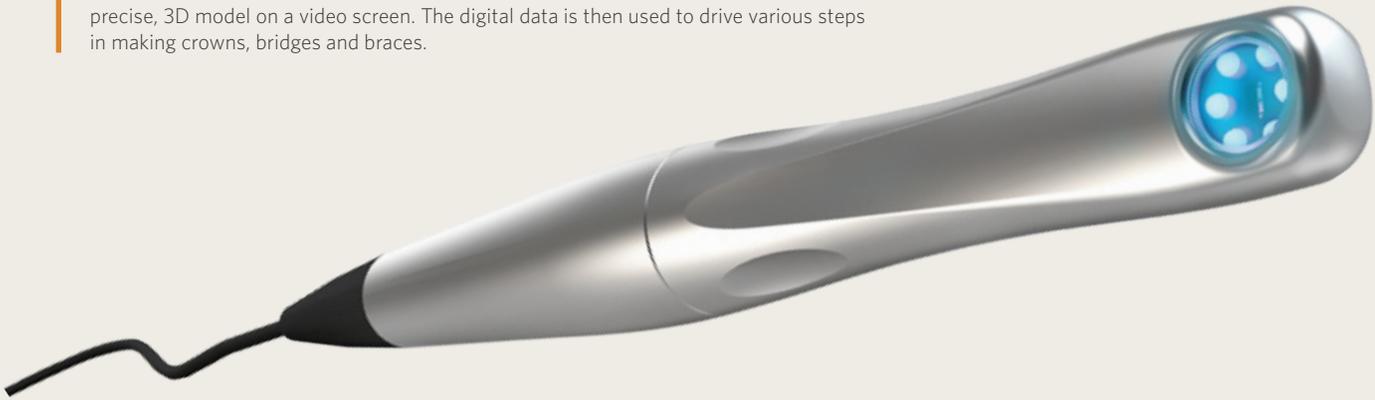


Photo courtesy of 3M ESPE

the way, teeth are translucent, and people rarely sit still — all of which makes it challenging.”

In 2003, the group formed Brontes Technologies with Paley in the role of CEO and Rosenbloom as COO. Named Chief Scientist, Rohaly, took on the task of evolving the technology to make it commercially viable. By 2006, they had solved all the major technical challenges, and clinical testing was under way. That was good enough for 3M, which acquired Brontes later

The team’s invention allows dentists to digitize and streamline traditional manual processes.

that year. Says Hart, “It shows why having inventors follow the technology as far as possible into the commercialization process is so important to the success of a product.”

DIGITIZING TRADITIONAL PROCESSES

Now in its second commercialized generation and rebranded as the 3M™ True Definition Scanner, the team’s invention allows dentists to digitize and streamline manual processes. It eliminates the messy ritual of making dental impressions using silicon resin. Instead, the dentist “paints” the teeth with pulsing blue light, rendering

a precise, 3D model on a video screen. The digital data is then used to drive various steps in making crowns, bridges and braces. This reduces fabrication time and costs and results in a better patient experience. Dentists also have found diagnostic and therapeutic uses the inventors never anticipated.

THE FIRST GRANT AND THE FIRST SUCCESS

None of this would have happened without the Deshpande Center. Newly formed in 2002, the center awarded its first-ever grant to Hart and Rohaly so they could commercialize the scanner, which was at the “proof of principle” stage, with a focus on facial recognition. The center’s first piece of advice—that they enter MIT’s renowned business plan competition—had a monumental impact. “That’s how we met Eric and Micah,” says Rohaly. “They drove the market search. They helped us make the shift from an academic mindset to more of a business and market focus. And when we were reluctant to turn down the funding for machine vision, they convinced us to go after the dentistry market.”

For Hart, the center legitimized the process of commercialization, which had been frowned on earlier in his career. “I was always at the borderline between academia and industry,” he says. “I like working on things and seeing them put to use. The Deshpande funding was a stamp that said, ‘Yes, MIT supports this kind of effort.’”