

Duo seeks V.C. for 'Smart Glasses'

By Julie M. Donnelly

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An implausible, futuristic idea to help the blind see again has become the lives' work of two men — one a physician named Joe Rizzo and the other an engineer named John Wyatt. The idea, to link an implant on the retina to a pair of "Smart Glasses" that could stimulate the brain to "see" without working eyes, has raised a total of \$35 million over the past 23 years from government agencies, including the **National Science Foundation** and **National Institutes of Health** and the **Veteran's Administration**. But for the first time Wyatt and Rizzo are seeking angel and venture capital investments, now as an incorporated Boston company with the name **Bionic Eye Technologies**.

"We were spending 40 percent of our time writing grants and we didn't want to do that anymore," said Wyatt, a professor in electrical engineering at the Massachusetts Institute of Technology. "Of course, now we are spending 40 percent of our time on the business."

The story goes that Rizzo, a neuro-ophthalmologist at the Massachusetts Eye and Ear Infirmary who treated patients with macular degeneration and other eye diseases that cause blindness, came up with the idea after a few years of disappointing results working on retinal transplants.

"In our field, we are known for being great diagnosticians, figuring out why people are going blind," Rizzo said. "But I wanted to do something to improve the quality of life for blind people."

Rizzo decided, after seeing the early promise of cochlear implants for deaf patients, that a technical, rather than a biological solution, might work for blind patients, too. He asked Wyatt if he would work on a technology using sensors attached to a retinal implant that connected to a pair of glasses, mounted with a tiny camera that would transmit light to the implant, mimicking sight.

The idea is that since electrical signals drive nerves, in principal one could send those signals from the retina to the brain using a series of pulses.

"Eventually, I ran out of reasons for why it wouldn't work, and we got started," Wyatt said. "A lot of people said it would be a multi-decade project, and they were right."

The team has done an experiment using six human patients and a thin, temporary membrane with 100 electrodes placed in contact with the retina, achieving proof of concept when patients could identify light coming from different directions. The team has also tested the retinal implant on 200 pigs, some for as long as 10 months. The device requires a battery operated processor, like an iPhone, that can fit in a pocket to deliver the power for the stimulation and transmit the visual information.

The new company is working on its next generation device, which will include more than 256 electrodes, and will be completed in the next nine to 12 months. Simultaneously, the company will try to

raise \$5 million to cover the preclinical regulatory work required by the **U.S. Food and Drug Administration** before its clears the device for a clinical trial, which would be carried out at Mass Eye and Ear with six patients.

The commercialization of the device is likely still five years off, and Bionic Eye Technologies already has competition. A California company, **Second Sight Medical Products Inc.**, whose scientists began work at around the same time as the Boston team, got European approval for its device, which includes 60 electrodes, in March 2011.

It's easy to understand how the complexity of the device, and the difficulty of working with the delicate retina, have made the quest for a bionic eye a lengthy one. But there is also another reason.

"So much money has gone into treatments for cancer or for rare diseases", Mass Eye and Ear CEO John Fernandez said. "But because blindness is not fatal, a much smaller share of resources have been put towards curing eye diseases." Fernandez said recruiting patients for the initial trial will be easy, despite the risks, because right now patients have no options.



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Dr. Joe Rizzo is working on tech to replace sight.

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