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TargetedHumans, Inc.

June 7, 2026 Newsletter

The Technology Behind the Eye Implant, the Cat Can See You, and the Bionic Eye

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Targeted Humans Conference Call

Sunday 8:00 p.m. EST

FreeConferenceCall: 605-475-4779

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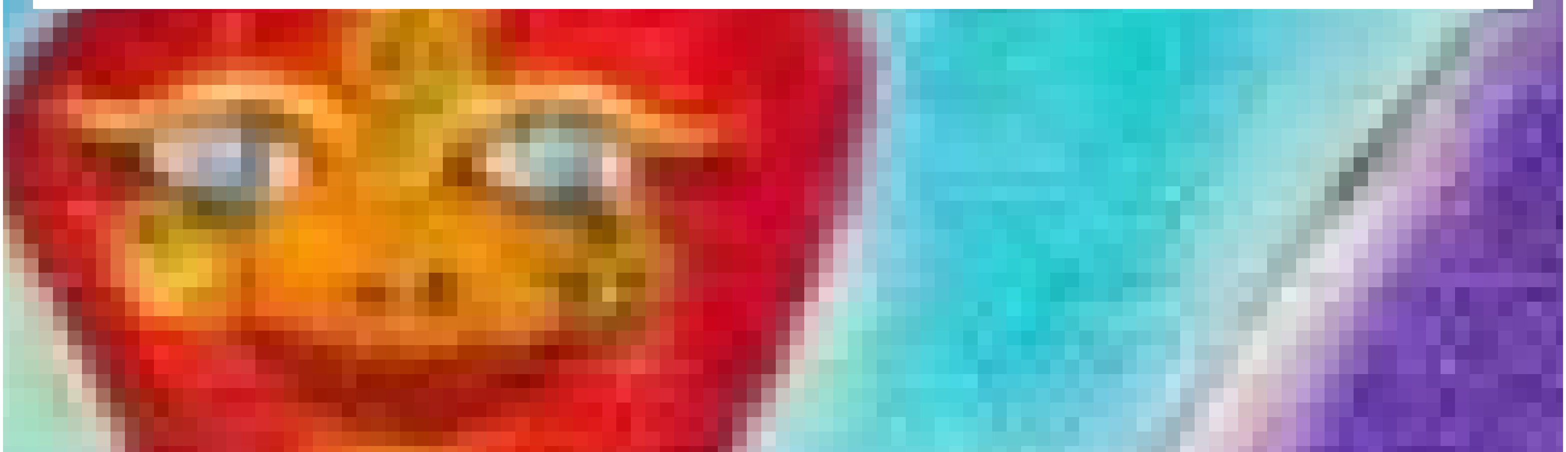
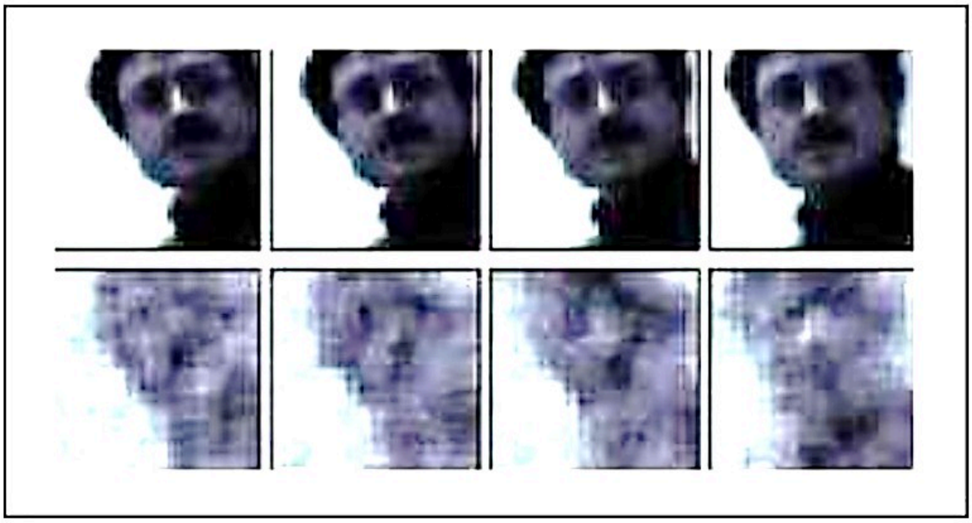
You can make a difference in educating America and the world about what Targeted Humans really are. Make a donation on our website to support this work. We have much work to do.



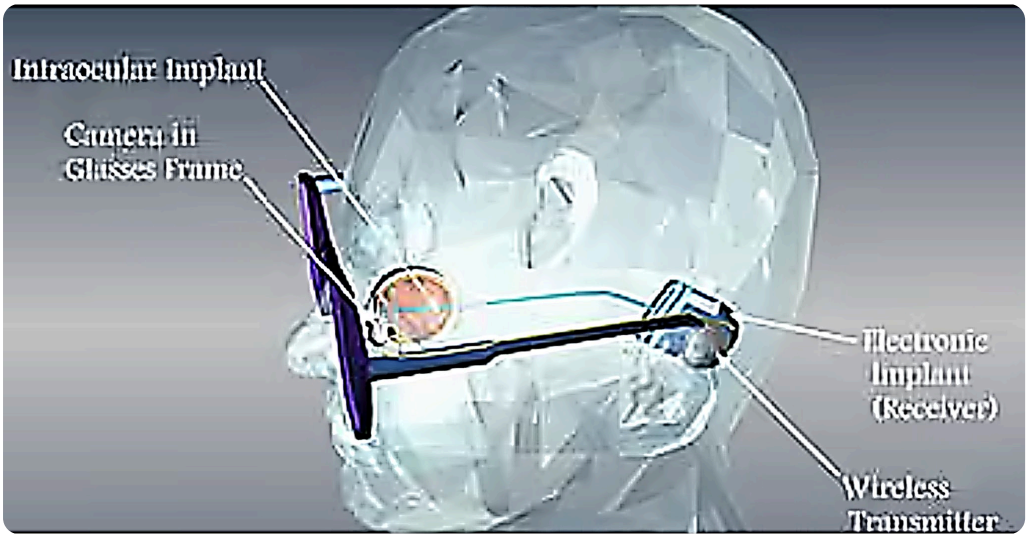


Reconstructed movie showing animal view of world proves scientists have a good understanding of how the brain processes visual information
https://newsarchive.berkeley.edu/news/media/releases/99legacy/10-15-1999.html

Neuroscientists have conducted two notable types of experiments with cat visual systems. The most famous "mind-reading" experiment at UC Berkeley used brain electrodes to decode and reconstruct exactly what a cat was seeing on a screen. Other veterinary trials implanted retinal microchips into blind cats to restore sight. [1, 2, 3, 4]

1. Reconstructing the Cat's View (UC Berkeley, 1999)
In a landmark 1999 study led by neuroscientist Dr. Yang Dan, researchers successfully "saw" through a cat's eyes.

- **How it worked:** Researchers inserted fiber electrodes into the thalamus region of anesthetized cats to measure the electrical activity of the neurons that carry visual signals from the retina.
- **The experiment:** They showed the cats black-and-white videos of natural scenes (like swaying trees and human faces) and recorded the firing patterns of 177 neurons.
- **The result:** Using a linear decoding technique, a computer translated these neuron signals back into video images. The reconstructed video produced fuzzy but recognizable images, proving that outside scenes can be extracted directly from brain signals. You can learn more about how this works on WIRED.



Robotic retina offers second chance for sight

This article is 19 years old. Imagine what is now

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https://www.theguardian.com/technology/2007/feb/16/news.medicineandhealth

Developing the first device took 16 years of research, but the 60 pixel version has taken just four. The implant is not suitable for every form of blindness. If the optic nerve or vision processing centres in the brain are damaged it cannot help, but there are many conditions in which patients lose the function of the receptor cells in the retina and go blind, even though the neural circuitry behind is intact.

Prof Humayun predicts that future versions of the bionic eye would need at least 1000 pixels for patients to recognise faces. And even further off is the possibility of manipulating the images the patients sees, for example allowing them to pause or enhance it by zooming in.

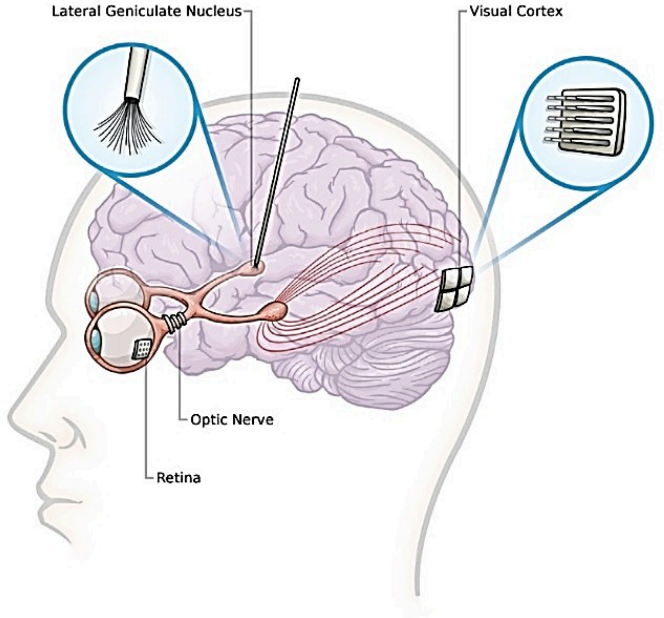

Fig. 1 – Graphical depiction of the visual pathways and electrical stimulation targets for developing a visual prosthesis. Small arrays of electrodes can be implanted epiretinally, subretinally or suprachoroidally to stimulate retinal ganglion cells and generate phosphenes. Similarly, the axons of these cells can be stimulated as they pass along the optic nerve, using "cuff-style" electrodes. The lateral geniculate nucleus can be accessed using conventional deep-brain stimulation electrodes, or newer-generation devices incorporating a "tuft" of microelectrodes. Lastly, the visual cortex may be stimulated directly using surface (not shown) or penetrating microelectrodes.

In 2007, the University of Missouri (MU) gained major attention for hosting a pioneering feline clinical trial that laid critical groundwork for bionic eye implants. The research focused on testing an artificial silicon retina (ASR) microchip to evaluate its safety and potential to restore partial sight in subjects with degenerative retinal diseases.

The 2007 MU Research

- **The Subjects:** Veterinary ophthalmologist Dr. Kristina Narfström led a study on 10 Abyssinian cats at MU with an inherited, progressive retinal disease similar to retinitis pigmentosa in humans.
- **The Tech:** The microchip—developed by Optobionics Corporation—was roughly \(0.1\) inches in diameter and about \(\frac{1}{1000}\) of an inch thick. It contained thousands of microscopic solar cells designed to convert light into electrical impulses to stimulate surviving retinal cells.

Restoration of vision in blind individuals using bionic devices: A review with a focus on cortical visual prostheses

https://tinyurl.com/r63vcht9

Neurobionics is the direct interfacing of electronic devices with the nervous system. This interface may be exploited to facilitate exogenous stimulation of the nervous system or for single and multi-unit recording of neural activity.

The significant therapeutic potential offered by neural recording is evident in recent reports of multi-electrode prostheses implanted in the motor cortex of humans and non-human primates, enabling the dextrous operation of a robotic arm and hands (Collinger et al., 2013, Hochberg et al., 2012).

This dexterity will undoubtedly be greatly enhanced by the integration of sensory feedback (e.g. mechanosensation), which has already been demonstrated in macaques via microstimulation of somatosensory cortex (Berg et al., 2013, O'Doherty et al., 2011, Tabot et al., 2013). Beyond the experimental domain, electrical stimulation of the brain, spinal cord and peripheral nerves via implanted electrodes is in use clinically for the treatment of movement disorders (Williams and Okun, 2013), psychiatric disorders (Williams and Okun, 2013), chronic pain (Plow et al., 2012), epilepsy (Bergey, 2013), neurogenic bladder (Lay and Das, 2012) and for the restoration of lost sensory functions such as hearing (Carlson et al., 2012, Shepherd et al., 2013). Currently, the most commercially successful sensory prosthesis is the cochlear implant for treatment of neural deafness, of which the US National Institutes of Health reports there were 324,200 recipients worldwide in December 2012 (National Institute on Deafness and Other Communication Disorders, 2013). Restoration of visual perception to the blind or severely vision impaired is another area of intense research effort and two retinal bionic vision devices are now commercially available (Weiland and Humayun, 2014). We briefly review these and other devices being developed for the restoration of functional vision in blind individuals, before focusing on cortical visual prostheses and the challenges facing developers of these devices. We describe an implant currently being developed by the Monash Vision Group which is currently in the preclinical testing phase.

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