

Out of Darkness

Helping the blind see with artificial vision.

Vision impairment is a major disability faced by millions around the world. Right now, the only way to obtain information about the world, reading, and enjoy life, and thus the ability to work, is through the use of a white cane or a guide dog. However, several groups around the world have used principles of electrical activation of the retina (EARS) to create a new way of seeing the world.

At the University of Southern California (USC), researchers led by James D. Weiland, Mark S. Hummer, and Armand K. D'Amico Jr. have developed a prototype artificial eye system that can be used by active implants, or low-power external devices, to provide visual information to the eye. The system consists of an external camera, a transmitter, a receiver, and an implant in the eye. The implant consists of a silicon chip with a grid of electrodes that can be used to stimulate the retina. The system is designed to be used by people who are blind due to damage to the retina, such as from glaucoma or age-related macular degeneration. The system is currently being tested in a clinical trial at USC.

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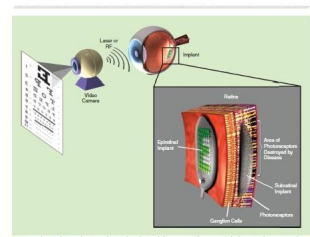


FIGURE 1: Schematic diagram of an artificial eye system. An external camera captures an image of a scene, which is transmitted to a transmitter. The transmitter is connected to a receiver, which is in turn connected to an implant in the eye. The implant consists of a silicon chip with a grid of electrodes that can be used to stimulate the retina. The system is designed to be used by people who are blind due to damage to the retina, such as from glaucoma or age-related macular degeneration. The system is currently being tested in a clinical trial at USC.

Several groups around the world have tested prototypes of artificial vision systems based on the principle of electrical activation of the retina.

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image processor, and stimulate activity in the dorsal retina. The eye is functionally regulated by color and movement, and the hand is able to see. This goal is the focus of the Neurosciences Institute's research. The Institute's research is focused on the development of low power microelectronics with a critical eye on the success of the competition in the worldwide market.

References
1. J. D. Wilson, M. S. Thoma, and J. D. Wilson, "The Eye as a Model for the Design of a Vision System," *IEEE Transactions on Systems, Man, and Cybernetics*, vol. 13, no. 6, pp. 1000-1010, 1983.
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About the Author
James D. Wilson received his B.S. from the University of Michigan in 1966. After four years in industry with Fairchild Semiconductor, he returned to Michigan to complete his M.S. and Ph.D. in 1971 and 1973, respectively. He received his doctorate in electrical engineering from the University of Michigan in 1973. He is currently an associate professor of electrical engineering at the University of Michigan. He has published over 100 papers in the field of neural networks and image processing. He is also the author of several books on neural networks and image processing.