**Bionic Eye: A Vision of the Future**

How many people suffer from blindness? According to the World Health Organization, an estimated 39 million people suffer from blindness, while a total 285 million are estimated to suffer from visual impairment of some kind. **(World Health Organization 2010, *WHO,* available at http://www.who.int/blindness/publications/globaldata/en/, (accessed April 22 2016)).**

The last 50 years have seen more scientific development than ever before in human history. The huge leaps forward that we have made as a species have completely changed our quality of life, in areas such as transportation, communication, and healthcare, opening up a whole new realm of possibilities never dreamed of outside the world of science-fiction. My presentation today is on a hugely significant technological development that has the potential to improve the standard of living for countless people around the world - the bionic eye.

This is a visual prosthesis that will allow people with blindness or visual impairment to see basic shapes time. It is a relatively new development, and primarily accredited to Australian scientists Gregg Suaning and Nigel Lovell. **(J. Dowling, 2008 'Current and future prospects for optoelectronical retinal prostheses', *Nature* December (19)pp.1-10).**

The most current model of the bionic eye is a 2/4 mm chip that took "3 PHD students 6 months of their lives" to map, according to Professor Lovell himself, and contains over 1 million wires. **(University of NSW Australia, 2016, *Unsw Australia,* available at https://www.engineering.unsw.edu.au/biomedical-engineering/research/research-highlights/bionic-eye-implant, (accessed April 13 2016)).**

The proposed model will feature an external camera, mounted in a pair of sunglasses, which will broadcast to an array of electrodes implanted on the rear surface of the retina of a biological eye. These electrodes will be electronically stimulated to send signals down the optic nerve and directly to the visual cortex of the brain, to be perceived as images. These images are by no means perfect. What the entire system does is record images, and translate them into the most accurate form currently possible, which at the moment is a series of white dots representing size, form, and depth or distance. These dots are called phosphenes. The goal of the bionic eye project is to provide blind people with the means to live more independently and increase their mobility. **(J. Dowling, 2008 'Current and future prospects for optoelectronical retinal prostheses', *Nature* December (19)pp.1-10).**

The next image shows us a little more detail. First, the camera captures images in real time, and sends these images as information to the microprocessor, which is mounted in a carrier in the glasses. The microprocessor converts this data, and transmits it to the receiver connected to the glasses in Fig.2. This is then sent directly to the electrode array inside the eye via a cable. This electrode array, referred to in Fig.4 as the retinal implant, converts the data once again into electronic signals or pulses, which travel down the optic nerve to be processed by the brain, and the data is perceived as a pattern of light and dark, and will appear as the phosphenes or white dots we mentioned earlier.

**(University of NSW Australia, 2016, *Unsw Australia,* available at https://www.engineering.unsw.edu.au/biomedical-engineering/research/research-highlights/bionic-eye-implant, (accessed April 13 2016)).**

The bionic eye aims to treat and improve the lives of people suffering from visual impairment. This technology will allow people who can't see to perceive basic shapes in the form of white dots and allow them to navigate obstacles. By perceiving even these basic shapes, the quality of life of any individual will naturally improve as they will have increased independence and mobility.The current prototype is cumbersome and ungainly.The prosthesis requires the user to wear the "sunglasses" at all times of use.Affordability could also be a drawback. If the device is expensive, it has the potential to exclude some people from access to the technology.Full vision is not currently possible - the bionic "eye" will give a basic representation of the environment only. The visual prosthesis could revolutionise the way that people suffering from visual impairment navigate public and private spaces. It could also potentially provide an insight into the development of future technologies linking machines to the brain and give an indication of how to treat similar impairments. Such a device, when operable, will have massive repercussions throughout the world of the visually impaired. It could drastically improve millions of lives. The current model is set to be released in 2020. While at the moment, the quality of vision it should be capable of delivering will be quite rudimentary and serve mostly to avoid obstacles, obviously as time goes on, the technology will only get more and more advanced.

**References:**

World Health Organization 2010, *WHO,* available at http://www.who.int/blindness/publications/globaldata/en/, (accessed April 22 2016).

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